

WTCI-46-P

W98-1121 - PANYNJ

WTC 92FL

Quality Assurance Division Design Standards

TAA No.

Tenant:

Charge Code:

REVIEW STATUS

[illegible]

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

MEMORANDUM

To: Ms. Teresa Koebel, Manager, World Trade Project Management
From: C. John Lin, P.E.
Date: August 31, 1998
Subject: WTC - ALTERATION APPLICATION W-981121 - PANYNJ - 1 WTC, 92ND FLOOR - CORRIDOR AND LOBBY UPGRADE

Reference: Review Request dated 8/17/98

Copy To:	J. Castaldo	T. O'Connor	Job Folder
	A. Fadavi	R. Rafferty	Chrono Folder
	J. Napolitano	A. Reiss	
	K. Piatt		

A review of the material listed below and submitted with the referenced request has been made.

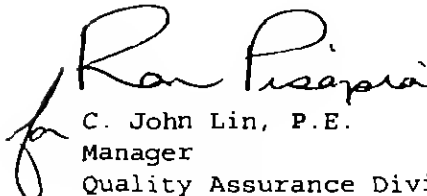
The previous recommendation that approval to proceed with construction be given subject to..., has been changed to recommending that **approval to proceed with construction** be given.

There are no comments.

Drawings: Specifications:

REMARKS: 1) Since there were no new drawings submitted, the previous list of drawing recommended for approval remains the same.

2) This memorandum was transmitted to the Facility via OA on August 31, 1998.


C. John Lin, P.E.
Manager
Quality Assurance Division

I.D.: W98-1121-004
KN/al

Reviewer:
K. Narsule, Fire Protection and Coordinator.

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
TENANT ALTERATION APPLICATION REVIEW REQUEST

XAP 9/8

DISTRIBUTION		
No	To	Facility
4	QAD	51 N
1	D. Warren	PATC ZIP43
1	S.P. Chiao	88-S
1	G. Daly	88-S
2	S. Batra	2WTC 37FL
1	C. Bonacci	2WTC 35FL

Facility One FLR 92nd TAA No. 981121 Date 8/24/98

Application / Tenant Corridor upgrade

Consultant Swanke

Estimated Cost 121,000 Submittal No. Three

Description of Work Corridor Upgrade

Please review the attached
(revised) application and
send comments to:

Name Jennifer Richardson

Location: 1 WTC - 88 - South Phone: 435- 2014

8/31/98
DUE DATE

DESIGN DISCIPLINES

- ☐ Architectural
- ☐ Egress Analysis
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☐ Sprinkler
- ☐ Electrical
- ☐ Utility > 600 V
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental
- ☐ Fueling
- ☐ Radio Freq. Coord.
- ☐ Corrosion Protection
- ☐ Elevator / Escalator
- ☐ Other _____

ATTACHMENTS

- ☐ Document List
- ☐ Contract Drawings
- ☒ Contract Specifications
- ☐ Tenant Response
- ☐ Computations
- ☐ Reports
- ☐ Catalog Cuts
- ☐ Other _____

Special Instructions

OFFICE COPY

Please review XAP
Specification change
only.

CITY OF N.Y. & N.J. WORKING DEPT. QUALITY ASSURANCE DIV. DESIGN STANDARDS AUG 27 1998 W98-1121 (4) RECEIVED ALTERATIONS APPLICATION TENANT CONSULTATION REVIEW UNIT

Copy To: G. Gaeta, J. Napolitano, S. Monteverde, N. Seliga

J. Richardson (Proj. Mgr.)

[Signature]
Signature

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

M E M O R A N D U M

To: Ms. Teresa Koebel, Manager, World Trade Project Management
From: C. John Lin, P.E.
Date: August 6, 1998
Subject: WTC - ALTERATION APPLICATION W-981121 - PANYNJ - 1 WTC, 92ND
FLOOR - CORRIDOR AND LOBBY UPGRADE

Reference: Review Request dated 7/28/98

Copy To:	J. Castaldo	J. Napolitano	Job Folder
	A. Fadavi	T. O'Connor	Chrono Folder
	K. Piatt	R. Rafferty	

A review of the material submitted with the referenced request has been made.

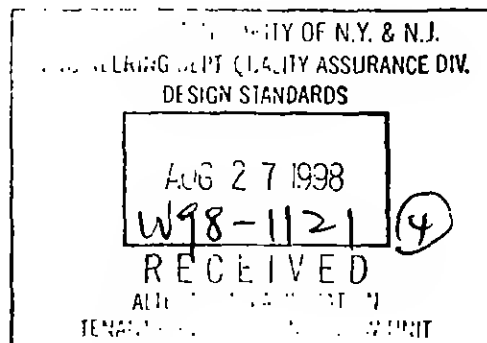
The previous recommendation of approval to proceed with construction remains unchanged subject to the submission of the items listed below being revised in accordance with the one (1) requirement listed on the attached rider.

Drawings:

- REMARKS: 1) See the attachment for a revised list of drawings recommended for approval.
- 2) This memorandum was transmitted to the Facility via OA on August 6, 1998.

C. John Lin, P.E.
Manager
Quality Assurance Division

I.D.: W98-1121-003
TSM/al
att.



Reviewers:
T. Santa Maria, Coordinator and Electrical; Z. Goldenberg, Mechanical;
D. Luey, Fire Protection.

OFFICE COPY

ATTACHMENT

ALTERATION APPLICATION W-971121

Subject to compliance with the requirements listed in this memorandum's rider, the following is a revised list of drawings recommended for approval:

Drawing

T-1	dated	3/16/98
T-2	dated	3/16/98
A-1	dated	3/16/98
A-2	dated	3/16/98
A-3	revised	4/21/98
E192K	dated	3/16/98
E192C	dated	3/16/98
M-1.0	dated	3/16/98
M-1.01	revised	7/23/98
SP-102	dated	2/13/98

080698

RIDER

ALTERATION APPLICATION W-981121

FIRE PROTECTION

1. Technical Specification 15300 - Sprinkler, Subsection 1.12B. Revise last sentence to read "...on the 92nd Floor of 2 WTC is 96.1 psig."

080698

SWANKE HAYDEN CONNELL ARCHITECTS

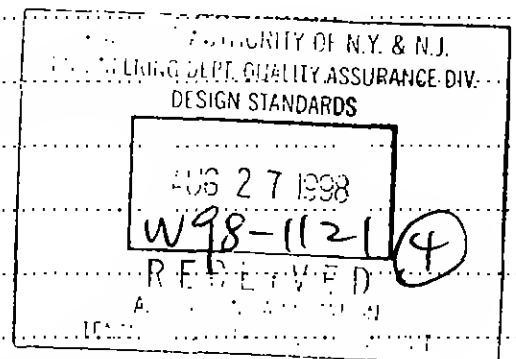
Transmittal

Re PANY 92ND FLOOR 15300 Spec. 3566-D Job No. 3566-D Date 8-17-98
 To Ms. JENNIFER RICHARDSON - PANY & NJ. TENANT PROJECT MANAGEMENT Attention
 Address One WTC, 88th Floor South NY, NY 10048
 Copy to MR. PHILIP CEBULSKI

☐ Prints ☐ Sepia ☐ Shop Drawings ☐ Other
☐ Specifications ☐ Mechanical Art Work ☐ Clears
☐ Federal Express ☐ Express Mail ☐ U.S. Mail ☐ Our Messenger
☐ Your Messenger

No. of Copies	Drawing No.	Title	Dated	Revised
3		SPEC. SECTION 15300 - SPRINKLER		

REVISED. 8-17-98.



Remarks REVISED SECTION 1.12 PARAGRAPH B
LAST SENTENCE TO READ "ON THE 92ND FLOOR
OF 2 WTC IS 96.1 PSIG." AS PER
YOUR REQUEST.

If items listed are not received, please notify

Signature

THANK YOU:
 Philip Karcis

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MULTI-TENANT CORRIDORS

Cosentini Associates LLP
Consulting Engineers

SECTION 15300

SPRINKLER

1.01 REFERENCE TO GENERAL CONDITIONS

- A. Perform the work in accordance with the requirements of the general conditions.

1.02 GENERAL

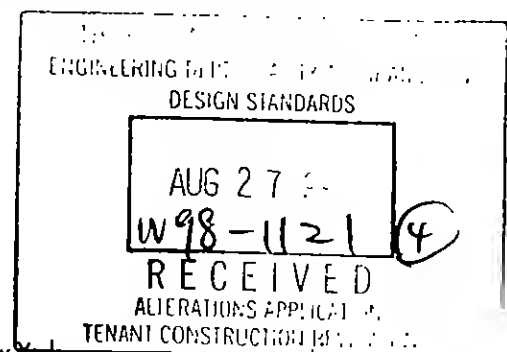
- A. Coordinate work with all other trades and existing conditions of the job site and maintain required ceiling heights and space conditions.
- B. Provide all materials, equipment, services, labor and tests necessary for complete execution of the plumbing work in accordance with the governing codes and authorities.

1.03 CODES, PERMITS, FILING, APPROVALS AND INSPECTIONS

- A. All work shall meet or exceed the latest requirements of NFPA-13 and all National, State, County, Municipal and other Authorities exercising jurisdiction over construction work at the project.
- B. Prepare and submit all drawings and documents required for approval agencies.
- C. Perform all filing and obtain all approvals required by agencies having jurisdiction.
- D. Obtain, and pay for all fees and costs for filing, approvals, permits; acceptance and inspection certificates.
- E. Obtain drawings and data of the existing building sprinkler installation, in order to expedite filing and approval. Include this data with the filing and approval submissions.

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15300-1



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MULTI-TENANT CORRIDORS

Cosentini Associates LLP
Consulting Engineers

1.04 **GUARANTEES AND CERTIFICATIONS**

- A. All work shall be guaranteed to be free from leaks or defects. Any defective materials or workmanship, as well as damage to the work of all trades resulting from same shall be replaced or repaired as directed for the duration of stipulated guaranteed periods. The duration of guarantee periods shall be one year.

1.05 **SHOP DRAWINGS AND OTHER INFORMATION REQUIRED**

- A. Prior to assembling or installing the work, the following shall be submitted for approval:
1. Scale drawings with reflected ceiling layouts and floors plans, dimensioned location of each sprinkler head, all piping with sizes, elevations, valves, equipment and appropriate indication of coordination with other trades. Show all existing sprinkler system piping and heads.
 2. Hydraulic calculations (Provide).

1.06 **CONNECTIONS TO EXISTING WORK AND ALTERATION**

- A. Connect new work to existing work in neat and approved manner. Restore existing work disturbed to original condition.
- B. Provide caps, plugs and outlets as required on existing piping.
- C. Remove and/or relocate existing and other work as required by alteration, as noted or as directed. All removed existing work shall be disposed of, or salvaged and removed to designated areas as directed.
- D. Coordinate with all other trades existing conditions at the job site. Maintain required ceiling heights and space conditions. Verify all piping locations with existing conditions.
- E. The existing plumbing system shall be left in perfect working order upon completion of all new work.

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MULTI-TENANT CORRIDORS**

Cosenlini Associates LLP
Consulting Engineers

- F. The Contractor shall request sprinkler shutdowns 48 hours in advance by notifying the PA/WTC Construction Inspector who will coordinate the shutdown. The Contractor shall insure that drainage will be discharged to an approved location or receptacle without causing damage to other work or property. All costs resulting from temporary shut-downs shall be borne by this contractor.

1.07 MISCELLANEOUS

- A. Provide as part of the work:-

- Hangers and supports for piping.
- Scaffolding, rigging, hoisting.
- Cutting and patching.
- Rubbish removal.
- Sleeves and openings, core drilling existing slabs.
- Caulking, packing and filling of sleeves and openings.
- Shop drawings with hydraulic calculations.
- Record as-built drawings.
- Obtaining all required permits, approvals and inspection certificates.
- Guarantee all work, labor and materials for one year following date of acceptance.
- Operating and maintenance instructions.
- Verify existing conditions.
- Spare parts and tools.
- Tests: operating, performance and code required tests.
- Protection of work during construction.
- Coordination with other trades.
- Cleaning.
- Identification: valve tags, valve tag schedules, piping identification.
- Compliance with materials and equipment division .
- Unit prices.
- Samples.
- Ladders: - Steel ladders for access to valves located over 7'-0" above floor.

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1.08 GENERAL INSTALLATION

- A. The sprinkler drawings are an interpretation of the information included in this specification, and are given as a guide only, and they therefore do not relieve this contractor from providing all work and equipment necessary to complete the installation according to the requirements. The number and spacing of sprinkler heads, spacing and size of pipe, location and number of valves, method of draining lines, and all other details and work shall be as required by the Owner's Underwriters, N.F.P.A. and all other governing authorities.
- B. The sprinkler heads in all areas are to be installed on a true axis line in both directions "with a maximum deviation from the axis line of 1/2" plus or minus. At the completion of the installation, if any heads are found to exceed the above mentioned tolerance, same shall be removed and reinstalled by this contractor.
- C. The arrangement, positions and connections of pipes, drains, valves, etc., shown on the drawings shall be taken as a close approximation and while they shall be followed as closely as possible, the right is reserved by the architect to change the locations, to accommodate any conditions which may arise during the progress of the work without additional compensation to this contractor for such changes, provided that the changes are requested prior to the installation of this contractor's work. The responsibility for accurately laying out the work rests with this contractor. Should it be found that any of his work is so laid out that interferences will occur he shall so report that to the architect.
- D. Provide all sprinkler heads and work in strict accordance with approved shop drawings. The architect reserves the right to reject any and all work not in accordance with the approved shop drawings.

1.09 SPRINKLER HEADS

- A. In all finished areas, sprinkler heads shall be Reliable Automatic Sprinkler Co., Model G4 "Concealer," BS&A 587-75-SA, with a 165°F temperature rating. The cover plate of heads must be chrome plated, not factory painted white. For 1, 2, and 5 WTC, orifice size shall be 1/2", in 4 WTC orifice size shall be 7/16".

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1.10 **PIPE AND FITTING MATERIALS**

- A. All wet system sprinkler piping shall be standard weight, Schedule 40 black steel pipe, conforming to ASTM A795/A53 with threaded cast iron fittings, Class 125, or malleable iron fittings, Class 150. Schedule 10 pipes, grooved piping, and mechanical grooved fittings are not permitted. Victaulic fittings are not permitted to be used for size 3 in. and under unless otherwise approved.

1.11 **SIGNS**

- A. Provide all designating signs as required by the agencies having jurisdiction.

1.12 **TESTS**

- A. Perform all required tests in the manner prescribed by and to the satisfaction of the Owner's insurance underwriters, and all authorities having jurisdiction. Owner's representatives shall be present inspect tests. Obtain all required certificates of approval and pay any fees or costs in conjunction therewith.
- B. Perform hydrostatic tests for all sections of the sprinkler piping systems installed under this Section, at not less than 200 psi pressure for two hours, or at 50 psi in excess of the maximum pressure, when the maximum pressure to be maintained in the system is in excess of 150 psi. The test pressure shall be read from a gauge located at the low elevation point of the individual system, or portion of the system being tested. The static pressure at the inlet of control valve on the 92nd floor of 2 WTC is 96.1 psig.
- C. Before an application for final acceptance of the work will be considered, all tests required and deemed necessary to show proper execution of the work shall have been performed in the presence of the Owner's representative. Scheduling of all testing procedures shall be arranged to suit the convenience of the Owner's representative.

1.13 **EXISTING SPRINKLER SYSTEM**

- A. Refurbish, relocate, modify existing sprinkler system.

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**Cosentini Associates LLP
Consulting Engineers**

- B. Existing system shall be changed as required in accordance with the new alteration work.
- C. Drain down existing piping to facilitate new work.

1.14 NOTES

- A. Locations and type of new sprinkler heads are indicated. New piping with connections to existing system is not shown. Contractor shall provide all new piping with new connections to existing system and modify existing system as required.
- B. Remove existing sprinkler heads as required. Removal and/or addition of sprinkler heads includes removal and/or addition of piping, fittings and all associated work.
- C. Sprinkler piping layout and pipe sizes shall be determined by the contractor in accordance with the room layouts and final locations of lights, diffuses, grilles, etc. and final ceiling construction type and architectural features.
- D. Utilize the existing sprinkler floor layout drawings and existing as-built conditions in conjunction with the new sprinkler work in order to provide an overall sprinkler installation compatible with the existing as-built conditions.

(1471-1.98\spk1r.spc)

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

MEMORANDUM

To: Ms. Teresa Koebel, Manager, World Trade Project Management
From: C. John Lin, P.E.
Date: August 6, 1998
Subject: **WTC - ALTERATION APPLICATION W-981121 - PANYNJ - 1 WTC, 92ND FLOOR - CORRIDOR AND LOBBY UPGRADE**

Reference: Review Request dated 7/28/98

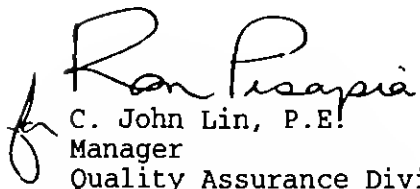
Copy To:	J. Castaldo	J. Napolitano	Job Folder
	A. Fadavi	T. O'Connor	Chrono Folder
	K. Piatt	R. Rafferty	

A review of the material submitted with the referenced request has been made.

The previous recommendation of approval to proceed with construction remains **unchanged** subject to the **submission** of the items listed below being **revised** in accordance with the **one (1) requirement** listed on the attached rider.

Drawings:

- REMARKS: 1) See the attachment for a revised list of drawings recommended for approval.
- 2) This memorandum was transmitted to the Facility via OA on August 6, 1998.


C. John Lin, P.E.
Manager
Quality Assurance Division

I.D.: W98-1121-003
TSM/al
att.

Reviewers:
T. Santa Maria, Coordinator and Electrical; Z. Goldenberg, Mechanical;
D. Luey, Fire Protection.

RIDER

ALTERATION APPLICATION W-981121

FIRE PROTECTION

1. Technical Specification 15300 - Sprinkler, Subsection 1.12B. Revise last sentence to read "...on the 92nd Floor of 2 WTC is 96.1 psig."

080698

ATTACHMENT

ALTERATION APPLICATION W-971121

Subject to compliance with the requirements listed in this memorandum's rider, the following is a revised list of drawings recommended for approval:

Drawing

T-1	dated	3/16/98
T-2	dated	3/16/98
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A-3	revised	4/21/98
E192K	dated	3/16/98
E192C	dated	3/16/98
M-1.0	dated	3/16/98
M-1.01	revised	7/23/98
SP-102	dated	2/13/98

080698

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
ENGINEERING DEPARTMENT - DESIGN DIVISION TAA REVIEW REQUEST

To: D. LUBY (Reviewer) Location: 745

From: QAD DESIGN STANDARDS

Date: 7, 28, 98

TAA # W98-1121-003
(Submission #)

Facility: 1 WTC/92

Tenant: PANYNJ

Rec'd. Date: 7, 28, 98

Description of Work: CORRIDOR/LOBBY UPGRADE

Charge Code: W2-X-X-200.444

Review Disciplines

- ☐ Architectural
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☒ Fire Protection/ Sprinklers/Etc.
- ☐ Electrical/Metering
- ☐ Utility > 600 V/ 5 KV
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental/Asbestos Abatem't
- ☐ Fueling
- ☐ Radio Frequency Coordination
- ☐ Corrosion Protection
- ☐ Elevator/Escalator
- ☐ Traffic
- ☐ Other(specify) _____

Attachments

- ☐ Document List
- ☒ Contract Drawings
- ☒ Contract Specifications
- ☒ Tenant Response
- ☐ Calculations
- ☐ Catalog Cuts
- ☐ Reports
- ☐ Certifications
- ☐ Previous Rider
- ☐ Other (specify) _____

Special Instructions

Reviewer Information

Name: _____

Date started: _____

Date completed: _____

Review time(days) _____

New comments _____

Repeat comments _____

DUE DATE: 8, 13, 98

Please notify the COORDINATOR if you cannot
complete the review by the due date.

Please review the attached submittal; FAX and send your written comments to the
following COORDINATOR:

Name: T. SANTA MARIA

Location: 51N

Phone #: (212) 435- 8609

FAX #: (212) 435-2069*

* If responding by fax, please advise coordinator in advance at telephone
number indicated. (Note new fax number).

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
TENANT ALTERATION APPLICATION REVIEW REQUEST

PAT 8/10
XAP 8/16

DISTRIBUTION		
No	To	Facility
④	QAD	51 N
1	D. Warren	PATC ZIP43
1	S.P. Chiao	88-S
1	G. Daly	88-S
2	S. Batra	2WTC 37FL
1	C. Bonacci	2WTC 35FL

Facility _____ FLR _____ TAA No. W98-1121 Date 7/28/98

Application / Tenant World Trade - Corridor & Lobby Upgrade

Consultant Swanke Hayden Connell

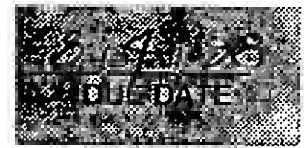
Estimated Cost \$150,000 Submittal No. Three

Description of Work Corridor upgrade

Please review the attached (revised) application and send comments to:

Name: Jennifer Richardson

Location: 1 WTC - 88 - South Phone: 435-2014



DESIGN DISCIPLINES

- ☒ Architectural
- ☐ Egress Analysis
- ☒ Structural
- ☒ HVAC
- ☒ Plumbing
- ☐ Sprinkler
- ☐ Electrical
- ☐ Utility > 600 V
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental
- ☐ Fueling
- ☐ Radio Freq. Coord.
- ☐ Corrosion Protection
- ☐ Elevator / Escalator
- ☐ Other _____

ATTACHMENTS

- ☒ Document List
- ☐ Contract Drawings
- ☐ Contract Specifications
- ☒ Tenant Response
- ☐ Computations
- ☐ Reports
- ☐ Catalog Cuts
- ☐ Other _____

Special Instructions

Please review in 5 days
NO RTF

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THE PORT AUTHORITY OF N.Y. & N.J.
ENGINEERING DEPT. QUALITY ASSURANCE DIV.
DESIGN STANDARDS

JUL 28 1998
W98-1121

RECEIVED ③
ALTERATIONS APPLICATION
TENANT CONSTRUCTION REVIEW UNIT

Copy To: ~~E. G. J. Napolitano, E. Monteverde, N. Seliga~~
J. Richardson (Proj. Mgr.)

[Signature]
Signature

295 Lafayette Street, New York, New York 10012
212 226 9696, Fax 212 219 0059

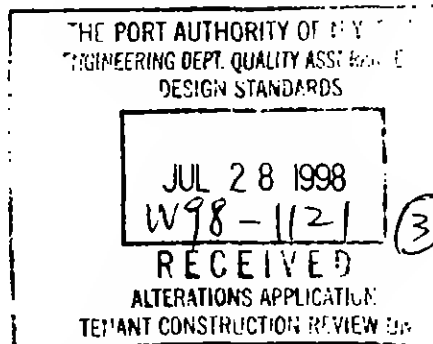
July 20, 1998

OFFICE COPY

Ms. Jennifer Richardson
Tenant Project Management Unit
One World Trade Center 88 South
New York, NY 10048

Re: Response to ADA Upgrade Toilets
92nd Floor-Base Building Project

Dear Ms. Richardson:



We are submitting herewith ten (10) sets of the revised documents. The revised documents have been signed and sealed by the Engineer and Architect of record who is licensed to practice in the State of New York. The latest revision number has been indicated on each drawing in the title box, each revision has been circled and the latest revision number has been indicated inside the triangle.

The following are our responses to your comments.

GENERAL

1. All design documents such as drawings, computations, and specifications shall be sealed and signed by the Architect or Engineer of Record licensed to practice in the State of New York.

All drawings are submitted in this package they are all sealed and signed. See enclosed drawing list.

ELECTRICAL

2. DRAWING E192C. The response to Comment 1 of the previous Rider is noted. Two (2) printouts of iso footcandle curves, Design File PA1 (EXHIBIT 1) and Design File PA2 (EXHIBIT 2) representing the Elevator Lobby and the Corridor, respectively, were submitted. Also submitted is a printout Design File PA2.des herein designated as EXHIBIT 3) showing levels of illumination along the Corridor during normal conditions
 - a) EXHIBIT 3 shows an average illumination of 12.9 fc and a minimum of 2.07 fc but EXHIBIT 1 and EXHIBIT 2 show that the levels of illumination drops to zero (no levels of illumination are shown) between the emergency fixtures.

Ms. Jennifer Richardson
92nd Floor upgrade
July 20, 1998
Page 2

.....

Please clarify, and submit printout of levels of illumination similar to EXHIBIT 3, but under emergency condition with the average and minimum levels of illumination indicated.

Response to 2.a See enclosed calculations the footcandle levels do not drop to 0 they remain at 2.4 no additional curves indicate constant reading.

- b) The levels of illumination submitted could not be verified since the following were not submitted, as requested in the previous Rider
 - i) Submit the photometric data for each type of emergency fixtures used, including a typical candlepower distribution curve for each. See Figure 10.3.
 - ii) Submit information and/or data used in calculating/verifying the levels of illumination

Response to 2.b See enclosed submissions of photometric data for each type of emergency fixture including typical candlepower, and distribution curve

- c) On Drawing (E192C), show the specific type of fixtures to be used. The emergency fixtures are designated as B/B1 and A/A1. Please be specific.

Response to 2.c Drawing was corrected also enclosed is a catalogue cut of fixture intended to be used. Fixtures are designed for 120V on the lighting fixture list. Typical A-1 and B-1 fixtures are indicated on the plan. Emergency fixtures are indicated on the plan and the notes require all said fixtures to be wired for 120V. The A-1 and B-1 fixtures are those which are designated as Emergency fixtures.

- d) EXHIBIT 1 and EXHIBIT 2. Please indicate on the printout the following: Fixture type, manufacturer, lamp designation, volt and volt-ampere (e.g., type A1, Neoray Fenestra 202/bx, F403bxsp35GE, 120V, 80VA).

Response to 2.d See enclosed catalogue cut of the fixture types these were included with the printout.

- e) EXHIBIT 1 and EXHIBIT 2. Please indicate on the printout all the computer input data used in calculating the levels of illumination. 8 1/2 X 11 attached.

Ms. Jennifer Richardson
92nd Floor upgrade
July 20, 1998
Page 3

.....
Response to 2.e See enclosed catalogue cut of the fixture types these were included with the printout.

MECHANICAL

3. Drawing M-1.01: Details of Methods of Hanging Ductwork. In this detail, specify the maximum distance between duct hangers as well as the minimum sizes of duct hanger straps in conformance with NYC Building Code RS 13-1, Section 2-1.1.2.3(a).(3) (4) and (5). Note that Section 2-1.1.2.3(a).(4) contains typographical error indicating the minimum hanger sizes as 1 inch by 1/18 inch instead of 1 inch by 1/8 inch. (Repeat comment)

Response to 3. Separation between duct hangers shall be 6 ft to 8 ft. Duct hanger straps shall be 1/8" thick, as per code RS 13-1.

FIRE PROTECTION

4. Drawing SP-102. Show all new and existing sprinkler piping and sizes in the area of work. See attached Drawing SP-9 (2 sheets). (Modified repeat comment).

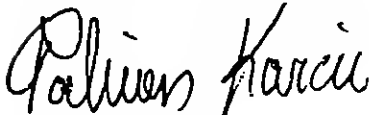
Response to 4. We need as built drawings to show all existing piping and sizes in scope of work.

5. Drawing SP-102 Technical Specifications Division 15 (Sections 15300 and 15500) are missing. Please submit for review. (Modified repeat comment).

Response to 5. See enclosed sprinkler specifications.

Sincerely,

SWANKE HAYDEN CONNELL ARCHITECTS



Fabian Karcic,
Project Manager

cc: Mr. Napolitano, PANY&NJ

Memorandum

Project Name and Address: Port Authority of NY and NJ One World Trade Center, 88 th Fl. South New York, NY 10048		Project No: 5566BC Project Director/Manager: Fabian Karcic Client: Port Authority Subject: 92 nd Floor Corridor and Lobby upgrade
To Jennifer Richardson	From Daniel Spanton	Date Prepared 7-22-98

Note:

The following is a list of drawings and their latest revision date:

<u>Dwg. #</u>	<u>Name</u>	<u>Rev. Date</u>
T-1	- Title Sheet	- 3/16/98
T-2	- List of abbreviations, Index of drawings, dwg. conventions and Notes	- 3/16/98
A-1	- Demolition Plan, Legend, and notes	- 3/16/98
A-2	- Construction Plan, legend and notes	- 3/13/98
A-3	- Reflected ceiling plan, legend and notes	- 4/21/98
A-4	- Elevations, Partition types, and misc. details	- 4/24/98
A-5	- Door types, Misc. details, and Schedules	- 4/24/98
E192K	- 92 nd floor demolition plan / symbol list	- 3/16/98
E192C	- 92 nd floor construction plan (lighting)	- 3/16/98
M1.00	- 92 nd floor demolition plan	- 3/16/98
M1.01	- 92 nd new HVAC ductwork plan	- 7/23/98
SP102	- 92 nd floor sprinkler plan	- 3/16/98

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cc: Fabian Karcic

PORT AUTHORITY OF NY & NJ
DEPT. OF TRANSPORTATION
DESIGN STANDARDS

JUL 28 1998
1998-1121 (3)

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TENANT CONSTRUCTION REVIEW

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SECTION 15300

SPRINKLER

1.01 REFERENCE TO GENERAL CONDITIONS

- A. Perform the work in accordance with the requirements of the general conditions.

1.02 GENERAL

- A. Coordinate work with all other trades and existing conditions of the job site and maintain required ceiling heights and space conditions.
- B. Provide all materials, equipment, services, labor and tests necessary for complete execution of the plumbing work in accordance with the governing codes and authorities.

1.03 CODES, PERMITS, FILING, APPROVALS AND INSPECTIONS

- A. All work shall meet or exceed the latest requirements of NFPA-13 and all National, State, County, Municipal and other Authorities exercising jurisdiction over construction work at the project.
- B. Prepare and submit all drawings and documents required for approval agencies.
- C. Perform all filing and obtain all approvals required by agencies having jurisdiction.
- D. Obtain, and pay for all fees and costs for filing, approvals, permits; acceptance and inspection certificates.
- E. Obtain drawings and data of the existing building sprinkler installation, in order to expedite filing and approval. Include this data with the filing and approval submissions.

15300-1

PORT AUTHORITY
FILING DEPT. QUALITY ASSURANCE
DESIGN STANDARDS

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1.04 GUARANTEES AND CERTIFICATIONS

- A. All work shall be guaranteed to be free from leaks or defects. Any defective materials or workmanship, as well as damage to the work of all trades resulting from same shall be replaced or repaired as directed for the duration of stipulated guaranteed periods. The duration of guarantee periods shall be one year.

1.05 SHOP DRAWINGS AND OTHER INFORMATION REQUIRED

- A. Prior to assembling or installing the work, the following shall be submitted for approval:
 - 1. Scale drawings with reflected ceiling layouts and floors plans, dimensioned location of each sprinkler head, all piping with sizes, elevations, valves, equipment and appropriate indication of coordination with other trades. Show all existing sprinkler system piping and heads.
 - 2. Hydraulic calculations (Provide).

1.06 CONNECTIONS TO EXISTING WORK AND ALTERATION

- A. Connect new work to existing work in neat and approved manner. Restore existing work disturbed to original condition.
- B. Provide caps, plugs and outlets as required on existing piping.
- C. Remove and/or relocate existing and other work as required by alteration, as noted or as directed. All removed existing work shall be disposed of, or salvaged and removed to designated areas as directed.
- D. Coordinate with all other trades existing conditions at the job site. Maintain required ceiling heights and space conditions. Verify all piping locations with existing conditions.
- E. The existing plumbing system shall be left in perfect working order upon completion of all new work.

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- F. The Contractor shall request sprinkler shutdowns 48 hours in advance by notifying the PA/WTC Construction Inspector who will coordinate the shutdown. The Contractor shall insure that drainage will be discharged to an approved location or receptacle without causing damage to other work or property. All costs resulting from temporary shut-downs shall be borne by this contractor.

1.07 MISCELLANEOUS

- A. Provide as part of the work:-

- Hangers and supports for piping.
- Scaffolding, rigging, hoisting.
- Cutting and patching.
- Rubbish removal.
- Sleeves and openings, core drilling existing slabs.
- Caulking, packing and filling of sleeves and openings.
- Shop drawings with hydraulic calculations.
- Record as-built drawings.
- Obtaining all required permits, approvals and inspection certificates.
- Guarantee all work, labor and materials for one year following date of acceptance.
- Operating and maintenance instructions.
- Verify existing conditions.
- Spare parts and tools.
- Tests: operating, performance and code required tests.
- Protection of work during construction.
- Coordination with other trades.
- Cleaning.
- Identification: valve tags, valve tag schedules, piping identification.
- Compliance with materials and equipment division.
- Unit prices.
- Samples.
- Ladders: - Steel ladders for access to valves located over 7'-0" above floor.

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1.08 **GENERAL INSTALLATION**

- A. The sprinkler drawings are an interpretation of the information included in this specification, and are given as a guide only, and they therefore do not relieve this contractor from providing all work and equipment necessary to complete the installation according to the requirements. The number and spacing of sprinkler heads, spacing and size of pipe, location and number of valves, method of draining lines, and all other details and work shall be as required by the Owner's Underwriters, N.F.P.A. and all other governing authorities.
- B. The sprinkler heads in all areas are to be installed on a true axis line in both directions "with a maximum deviation from the axis line of $\frac{1}{2}$ " plus or minus. At the completion of the installation, if any heads are found to exceed the above mentioned tolerance, same shall be removed and reinstalled by this contractor.
- C. The arrangement, positions and connections of pipes, drains, valves, etc., shown on the drawings shall be taken as a close approximation and while they shall be followed as closely as possible, the right is reserved by the architect to change the locations, to accommodate any conditions which may arise during the progress of the work without additional compensation to this contractor for such changes, provided that the changes are requested prior to the installation of this contractor's work. The responsibility for accurately laying out the work rests with this contractor. Should it be found that any of his work is so laid out that interferences will occur he shall so report that to the architect.
- D. Provide all sprinkler heads and work in strict accordance with approved shop drawings. The architect reserves the right to reject any and all work not in accordance with the approved shop drawings.

1.09 **SPRINKLER HEADS**

- A. In all finished areas, sprinkler heads shall be Reliable Automatic Sprinkler Co., Model G4 "Concealer," BS&A 587-75-SA, with a 165°F temperature rating. The cover plate of heads must be chrome plated, not factory painted white. For 1, 2, and 5 WTC, orifice size shall be $\frac{1}{2}$ ", in 4 WTC orifice size shall be $\frac{7}{16}$ ".

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1.10 PIPE AND FITTING MATERIALS

- A. All wet system sprinkler piping shall be standard weight, Schedule 40 black steel pipe, conforming to ASTM A795/A53 with threaded cast iron fittings, Class 125, or malleable iron fittings, Class 150. Schedule 10 pipes, grooved piping, and mechanical grooved fittings are not permitted. Victaulic fittings are not permitted to be used for size 3 in. and under unless otherwise approved.

1.11 SIGNS

- A. Provide all designating signs as required by the agencies having jurisdiction.

1.12 TESTS

- A. Perform all required tests in the manner prescribed by and to the satisfaction of the Owner's insurance underwriters, and all authorities having jurisdiction. Owner's representatives shall be present inspect tests. Obtain all required certificates of approval and pay any fees or costs in conjunction therewith.
- B. Perform hydrostatic tests for all sections of the sprinkler piping systems installed under this Section, at not less than 200 psi pressure for two hours, or at 50 psi in excess of the maximum pressure, when the maximum pressure to be maintained in the system is in excess of 150 psi. The test pressure shall be read from a gauge located at the low elevation point of the individual system, or portion of the system being tested. The static pressure at the inlet of control valve on the 87th floor of 2 WTC is 124.7 psig.
- C. Before an application for final acceptance of the work will be considered, all tests required and deemed necessary to show proper execution of the work shall have been performed in the presence of the Owner's representative. Scheduling of all testing procedures shall be arranged to suit the convenience of the Owner's representative.

1.13 EXISTING SPRINKLER SYSTEM

- A. Refurbish, relocate, modify existing sprinkler system.

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- B. Existing system shall be changed as required in accordance with the new alteration work.
- C. Drain down existing piping to facilitate new work.

1.14 **NOTES**

- A. Locations and type of new sprinkler heads are indicated. New piping with connections to existing system is not shown. Contractor shall provide all new piping with new connections to existing system and modify existing system as required.
- B. Remove existing sprinkler heads as required. Removal and/or addition of sprinkler heads includes removal and/or addition of piping, fittings and all associated work.
- C. Sprinkler piping layout and pipe sizes shall be determined by the contractor in accordance with the room layouts and final locations of lights, diffuses, grilles, etc. and final ceiling construction type and architectural features.
- D. Utilize the existing sprinkler floor layout drawings and existing as-built conditions in conjunction with the new sprinkler work in order to provide an overall sprinkler installation compatible with the existing as-built conditions.

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SECTION 15500

HVAC

1.01 GENERAL

- A. Applicable provisions of the general construction specifications shall apply.
- B. The contractor shall coordinate his work or adjust same to that of other trades, in order that conflicts in space locations do not occur.
- C. The work under this contract shall be performed simultaneously with work of other trades, so as not to delay the overall progress of work.
- D. This contractor shall be responsible for his work with its completion and final acceptance and shall replace any of same which may be damaged, lost or stolen, without additional cost to the owner.
- E. This contractor shall provide all items of labor and materials not specifically indicated, but required to complete the intended installations.
- F. Prior to submitting bid proposal, contractor shall visit the site and familiarize himself with the existing ac system, ductwork, piping, etc in order to understand entire scope of work in order to prevent any extra charges once work begins.
- G. All work to be in accordance with all applicable governing codes and regulations.
- H. Existing ducts and pipes, in most instances shall remain unchanged. However, contractor shall modify existing supply and return ductwork and piping as shown on the drawings.
- I. All new ductwork shall be kept as high as possible so as to maintain ceiling heights shown on architectural drawings.
- J. Mechanical contractor shall coordinate his work with all other trades.

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- K. Where piping, lights and ductwork conflict, ductwork shall set up and down.
- L. Connect new work to existing as shown on the drawings.
- M. Contractor shall provide 16 gauge access doors to general contractor for installation in gypsum board ceilings for access to all volume dampers, fire dampers, valves, etc. However, Architect must approve all locations prior to installation. Access kits shall be provided in acoustical tile ceilings as tagged by this contractor for access to all volume dampers and fire dampers.
- N. Contractor shall coordinate exact location of all air outlets with architect's reflected ceiling drawings.

1.02 **CODES, PERMIT AND INSPECTION**

- A. All work shall meet or exceed latest requirement of the national, state, country, municipal and other authorities exercising jurisdiction of their work of this project. In addition it must meet all the requirements of P.A. of N.Y. & N.J.
- B. Any portion of work which is not subject to the approval of an authority having jurisdiction shall be provided in accordance with national fire protection association requirements.
- C. Pay all required fees, secure permits and inspection certifications and transmit same to the owner at the completion of the work.
- D. Contractor shall be responsible for filing all documents with all city agencies. Controlled inspection shall be done by this contractor..

1.03 **SHOP DRAWINGS & EQUIPMENT SUBMISSIONS**

- A. For (4) of ductwork, piping and certified equipment manufacturer's data shall be submitted for approval prior to fabrications, erection or purchase.

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1.04 **APPROVAL AND SUBSTITUTION**

- A. It is the intent of the specifications that wherever a manufacturer is specified and substitutions are made, they shall conform in all respect to the specified item. Criteria as delineated for equipment shall be interpreted as minimum performance requirements.
- B. Substituted equipment where permitted must conform to space requirement, any substituted equipment that cannot meet space requirements whether approved or not shall be replaced at the contractor's expense. Any modification of related systems or additional costs that result from substituted equipment shall be borne by this contractor.

1.05 **TESTING, ADJUSTING AND BALANCING**

- A. This contractor shall make all required adjustments of all systems and devices until all specified performance are met.
- B. All systems shall be tested and balanced to conform to quantities shown on drawings. Air balances shall be performed by an independent contractor who is a member of the associated air balance. Three (3) copies of test and balance reports shall be submitted for approval by the engineer.

1.06 **GUARANTEE AND SERVICE**

- A. The contractor shall guarantee the entire installation for a period of one year from the date of the final acceptance of the installation by the owner.
- B. The contractor shall during the period of guarantee replace or repair at his owner expense any piece of equipment and/or material which is found to be defective. The contractor shall also repair all damage to surrounding work caused by the failure, repair or replacement of defective equipment at his own expense.

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1.07 DUCTWORK

- A. Ductwork layouts and routes as shown on the drawings are schematic therefor changes in duct sizes and/or locations shall be made where necessary to conform to space conditions or obtain maximum headroom conditions without additional costs.
- B. Ductwork shall be galvanized steel as indicated on the drawings and shall be fabricated in conformance with latest recommendations of SMACNA (including gauges). Duct leakage shall not exceed .5%.

<u>DUCT SYSTEM</u>	<u>SMACNA</u> <u>TABLE</u> <u>CLASS</u>	<u>SMACNA</u> <u>TABLE</u> <u>CLASS</u>	<u>SMACNA</u> <u>TABLE</u> <u>CLASS</u>
All ductwork downstream of shafts and AC units	1-5	+2" W.G.	B

- C. All low velocity branch supply air duct splits and taps shall be provided with manual volume dampers. Each volume damper shall be provided with quadrant and position lever with wing nut type lock. Provide volume damper for each air outlet.
- D. Flexible Air Duct
1. Flexible air ducts shall be all metal construction consisting of bonded two-ply laminate mechanically corrugated for strength and air tightness. Flexible air duct shall be semi-rigid construction capable of being easily hand performed into required elbows or offsets to suit job conditions without subsequent sagging or droop. Duct connections to equipment outlet collars shall be made in accordance with the duct manufacturer's recommendations. Flexible duct shall be Flexmaster Type V as manufactured by Flexmaster USA Corporation, or approved equal.

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2. Material shall have been tested by Underwriters Laboratories Inc. and given the listing 181, Class 1 duct material and comply with NFPA 90A. (Fire spread rate of 25 and maximum smoke developed rate of 50). Insulated assembly with a vapor barrier jacket (C-factor of 0.23 BTUH/S.F. Deg. °F) @ 75°F with MEA. Flexible duct shall be no longer than 3'0".
 3. Connections shall be clamped with Ideal Type 52 hose clamps.
 4. Length of flexible duct shall be as shown on the drawings but shall not exceed length dictated by local jurisdiction.
 5. Cut duct to proper length to avoid sharp bends.
- E. All square elbows shall be provided with ducturns.
- F. First 15'-0" of duct from discharge of HVAC/ unit shall be acoustically lined with internal lining 1" thick, Johns Manville, Linacoustics. Duct sizes shown on drawings are clear dimensions.

1.08 **AIR DISTRIBUTION DEVICES**

- A. Refer to schedules on drawings for sizes.
- B. Ceiling diffuser shall be Price, Titus or Anemostat.
1. Diffusers, supply shall be 24" x 24" face size neck size as shown with opposed blade dampers.
 2. Diffusers, return shall be 24' x 24' face size, neck size as shown.

1.09 **INSULATION**

- A. Insulation shall be applied to clean dry surfaces.
- B. Insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings as tested by procedure ASTM E.84, NFPA 255 or UL 723 not exceeding:

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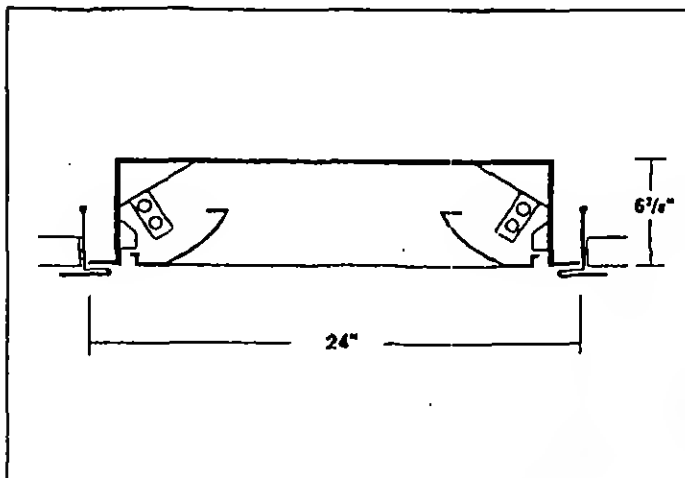
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Flame Spread	25
Smoke Developed	50

Accessories such as adhesives, mastics, cements, and tapes for fittings shall have the same component rating as listed above. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed requirements. Treatment of jackets or facings to impart flame and smoke-safety shall be permanent. The use of watersoluble treatments is prohibited.

- C. All supply air ductwork except that which is acoustically lined, shall be covered with 1" thick flexible fiberglass insulation with a maximum "K" factor of .15 at 75°F mean temperature, with reinforced foil-faced flame resistant draft vapor barrier.
- D. All chilled water supply and return piping shall be insulated with 1-1/2" thick glass fiber insulation with a maximum "K" factor of .24 at 75°F mean temperature with factory applied all service jacket. Fittings and valves shall be insulated with minimum one-pound density FSK-faced fiberglass blanket 18 gauge copperclad wire. Exposed edges of insulation shall be sealed off with BF 30-35. Finished thickness of insulation on fittings and valves shall be at least as great as that on adjoining pipes.

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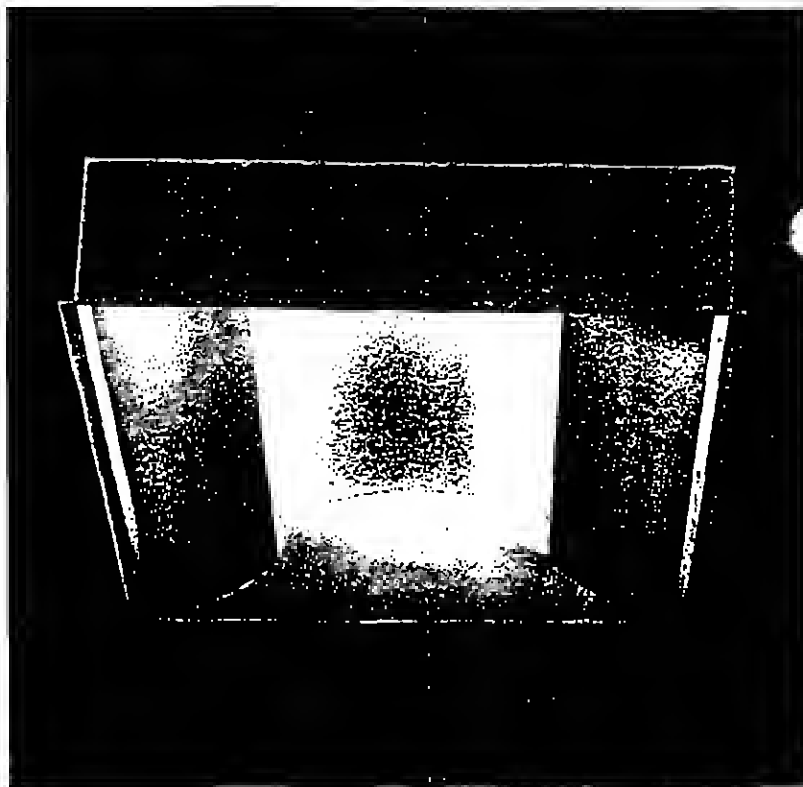
Series 202/Bx**"A/A"**

Wattage	(2) 40 watt Biax lamps, 120V magnetic ballast
Design Date	1993
Materials	20 ga. steel housing and reflector with custom perforated pattern lamp shields.
Description	2x2 or 2x4 recessed direct, totally diffused light, UL listed

RECOMMENDED FOR:

- *Hallways*
- *Small Offices*
- *Open Landscape*
- *Hospitality*
- *Showrooms*

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Trading Floors



PATENT PENDING

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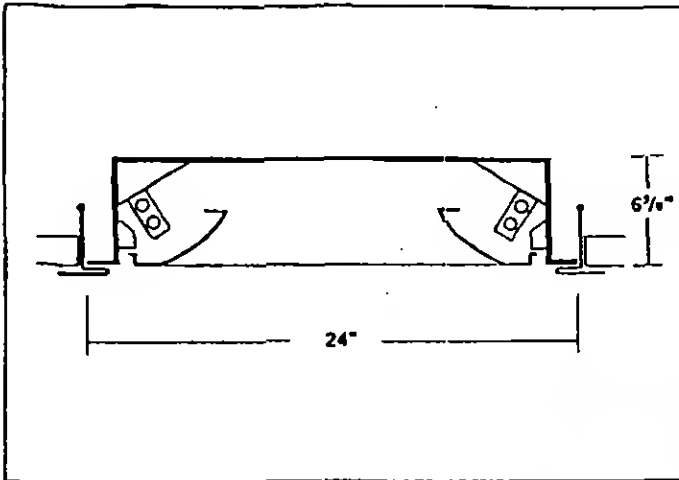
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ORDERING INFORMATION

CATALOG NO.	LAMPS	SIZE (Ft.)
202R/2BX-A	(2) 40W Biax	2'x2' nom.
202R/4BX-4	(4) 40W Biax	2'x2' nom.

neoray
NATURALLY

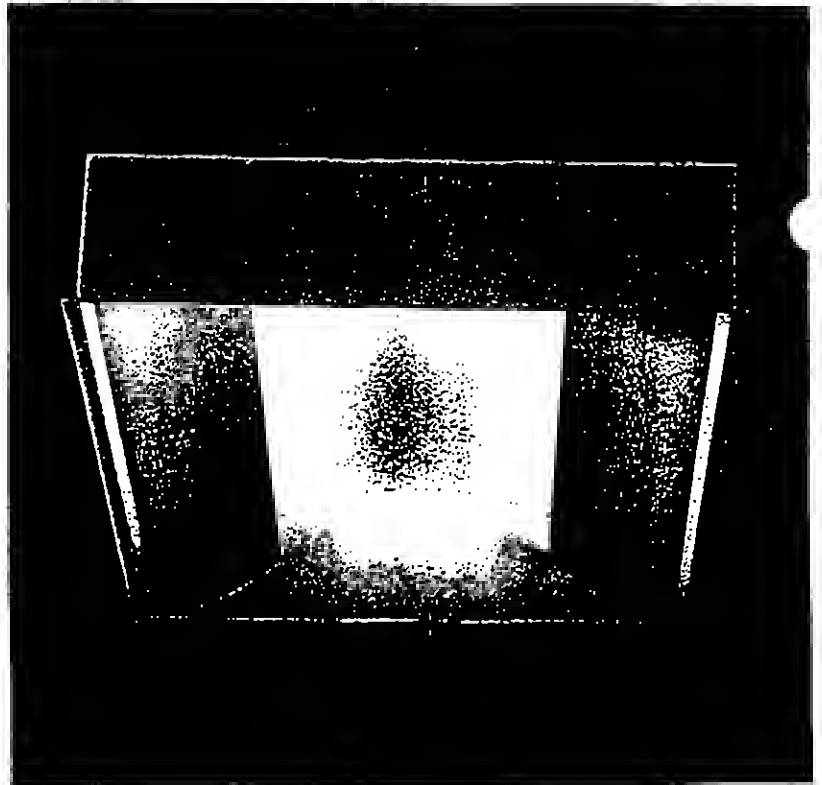
Neo-Ray Lighting 537 Johnson Avenue, Brooklyn NY 11237 • Tel: (718) 456-7400 • Fax: (718) 456-5492

Series 202/BX**A/A₁**

Wattage	(2) 40 watt Biax lamps, 120V magnetic ballast
Design Date	1993
Materials	20 ga. steel housing and reflector with custom perforated pattern lamp shields.
Description	2x2 or 2x4 recessed direct, totally diffused light, UL listed

RECOMMENDED FOR:

- *Hallways*
- *Small Offices*
- *Open Landscape*
- *Hospitality*
- *Showrooms*
- *VDT use spaces*
- *Trading Floors*



PATENT PENDING

ORDERING INFORMATION

CATALOG NO.	LAMPS	SIZE (Ft.)
202R/2BX-A	(2) 40W Biax	2'x2' nom.
202R/4BX-4	(4) 40W Biax	2'x2' nom.

neoray
NATURALIVE

Neo-Ray Lighting 537 Johnson Avenue, Brooklyn NY 11237 • Tel: (718) 456-7400 • Fax: (718) 456-5492

Fenestra Series 202/204/BX**RECESSED LAY IN, Luminaire**

A/A1

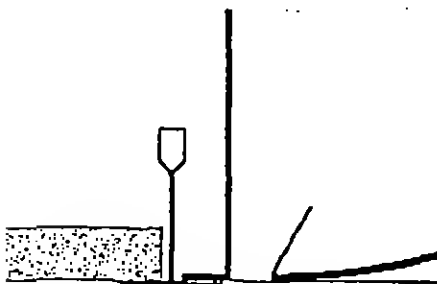
SPECIFICATIONS

Lighting Direct/Ambient
Mounting Recessed lay-in
Lengths 2' x 2' or 2' x 4'
Shielding Perforated metal backed by a white acrylic diffuser
Lamps (2) or (4) 40W T5 rapid start biaxial lamps (not by Neo-Ray)
Ballast 120 volt, 270 mA, electronic, class P
Material 20 ga. steel construction
Finish Baked on low gloss white powder coated polyester-epoxy

OPTIONS

Ballast 277 volt, Dimming
Emergency Battery-pack

U.L. listed and union made, IBEW/AFL-CIO

MOUNTING

D Lay-in Exposed Tee Grid

PHOTOMETRICS

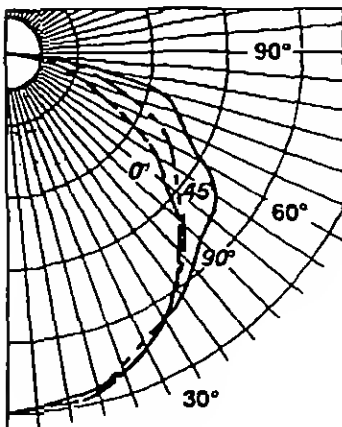
Report No. 8298.2 for Cat No. 202/BX
 Lamp Type: F40BXSPX35/RS, 3150 lumens
 I.E.S. data disk no. 202DRA2Y.IES

LUMEN SUMMARY

ZONE	LUMENS	% LAMP	% FIXT
0-30	748	11.9	24.6
0-40	1229	19.5	40.5
0-60	2230	35.4	73.4
0-90	3037	48.2	100.0
90-180	0	0	0
0-180	3037	48.2	100.0

IES Spacing Criteria:

End = 1.3 Diagonal = 1.3 Cross = 1.3

CANDLEPOWER DISTRIBUTION**COEFFICIENTS OF UTILIZATION**

FLOOR	20%									
CEILING	80%									
WALL	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%
RCR	ZONAL CAVITY METHOD									
1	.52	.50	.48	.46	.47	.45	.44	.45	.44	.42
2	.48	.43	.40	.37	.41	.38	.36	.39	.37	.35
3	.43	.38	.34	.31	.36	.33	.30	.35	.32	.30
4	.40	.34	.29	.26	.32	.28	.26	.31	.28	.25
5	.36	.30	.25	.22	.28	.24	.21	.27	.24	.21
6	.33	.26	.22	.19	.25	.21	.19	.24	.21	.18
7	.30	.24	.19	.16	.23	.19	.16	.22	.18	.16
8	.28	.21	.17	.14	.20	.17	.14	.20	.16	.14
9	.26	.19	.15	.12	.18	.15	.12	.18	.14	.12
10	.24	.17	.13	.11	.16	.13	.11	.16	.13	.11

CANDLEPOWER DIST.

VERT. ANG.	0	22.5	45	67.5	90	ZONAL LUMENS
0	951	951	951	951	951	
5	945	954	945	946	943	90.4
10	945	946	949	933	927	
15	929	932	927	912	915	261.7
20	896	887	883	891	894	
25	859	853	845	861	860	395.6
30	814	817	814	823	818	
35	761	760	755	775	788	481.3
40	689	702	706	735	746	
45	627	617	649	678	703	505.1
50	546	553	581	653	684	
55	478	484	534	625	660	496.1
60	392	412	492	576	595	
65	315	337	437	494	517	417.9
70	244	272	365	437	473	
75	178	207	284	373	426	308.4
80	113	131	201	280	294	
85	42	49	75	99	99	80.1
90	0	0	0	0	0	

neoray
NATURALLY

NEO-RAY LIGHTING 537 Johnson Avenue, Brooklyn, NY 11237 Tel: 718/456-7400 Toll free: 800/221-0946 Fax: 718/456-5492

SUPER BAFLUX 226/8

recessed compact fluorescent downlight/wallwasher

1-52

FEATURES

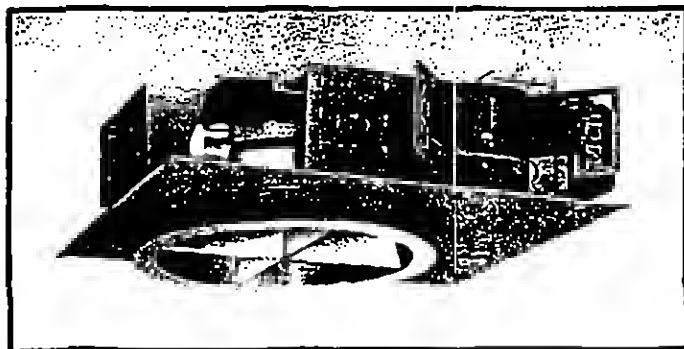
Super Baflux 226/8 is an efficient 8" aperture downlight, for use with two 26-watt compact fluorescent lamps. Its unique parabolic reflector and cross-baffle assembly provides precise optical control with very low aperture brightness. Shielding angles are 32° parallel to and 40° perpendicular to the lamps. Recess depth is only 4 3/4".

One housing allows interchangeable use of downlight and wallwash reflectors, permitting housings to be installed first and reflectors to be installed or changed at any time.

Super Baflux 226/8 uses two 26-watt, 4-pin lamps providing 3600 lumens (nearly as many as a 200-watt incandescent), c. 10,000-hour life, a color rendering index (CRI) of 85, and color temperatures as warm as 2700°K (nearly duplicating the color qualities of incandescent).

Reflector assemblies are available in clear natural aluminum and champagne gold with anti-iridescent anodizing, as well as in powder, bronze and white enamel finishes. Wallwash reflectors are also available.

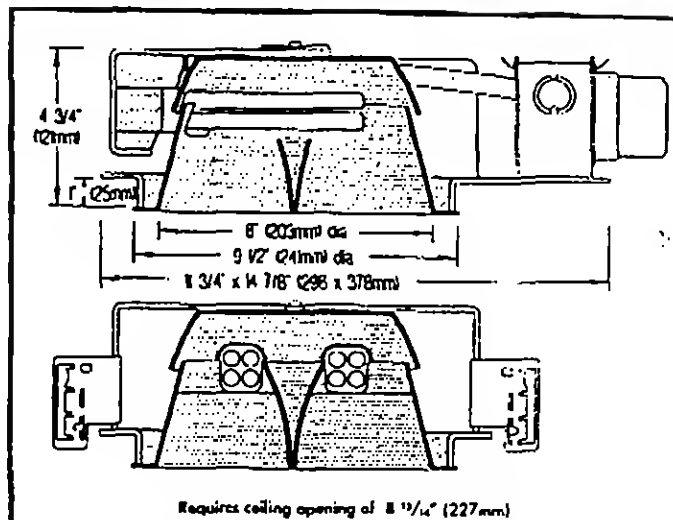
Super Baflux 226/8 includes a pair of mounting bars (1/2" x 27" C channel). Specialty bars for wood joist and T-bar installations are available as accessories.



APPLICATIONS

Fixture is recommended for downlighting or wallwashing in nearly all architectural environments, especially those spaces where non-directional luminaires are preferred over rectangular troffers. These include offices, lobbies, corridors, restrooms and public areas. The shallow recess depth allows mounting in constricted plenum situations.

Fixture is UL listed for Damp Location (may not be suitable for some outdoor environments). Fixture is union made (BEW) and in compliance with the component based efficiency standards of the 1995 New York State Energy Conservation Code. Fixture is prewired with high power factor Class P electronic ballast and approved for eight #12 wire 75°C branch circuit pull-through wiring. Removal of the reflector allows access to the ballast and junction box.



In inaccessible ceilings, a total depth of 7 1/2" (191mm) is required to allow ballast removal.

PRODUCT CODE

For a complete product code, list the basic unit and select one code item from each of the following boxes.

Basic Unit	SB 226/B	
Reflector Type		
Downlight	no suffix	
Wallwash	WW	
Voltage		
120 volt service	120	
277 volt service	277	
Reflector and Flange Color		
Clear	COL Pewter	POL
Champagne Gold	GOL Bronze	ZOL
Semi-specular Clear	EOL White	WOL
Standard reflector flange continues reflector finish. White painted flanges and custom painted flanges are available. Add WF (white flange) or CCF (custom color flange).		

OPTIONS

Specify by adding to the basic unit.

Equipped with magnetic ballast. Use 2-pin lamps only (G-24D3 base)	- MAG
Dimmable; with Lutron® Hi-Lume® electronic dimming ballast; for use with Lutron controls (by others). Not for outdoor application	- DM
Emergency battery pack operates lamp in event of power outage. Not available with DWW reflector. An additional 3 1/2" (89mm) is required to remove EM pack through aperture. No through wiring. Not for outdoor application	- EM
1/4" (3mm) thick prismatic acrylic lens within reflector	- P
1/4" (3mm) thick diffuse white acrylic within reflector	- D
1/4" (3mm) thick clear acrylic shield within reflector	- PS

► For combinations of the Options above, contact factory or Edison Price Lighting representative.

EDISON PRICE
LIGHTING

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SUPER BAFLUX 226/8

recessed compact fluorescent downlight/wallwasher

FEATURES

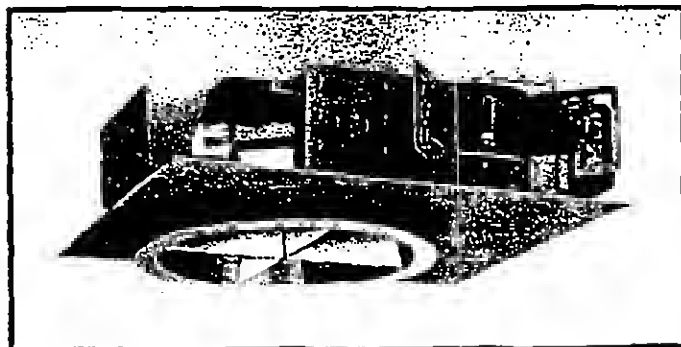
Super Baflux 226/8 is an efficient 8" aperture downlight, for use with two 26-watt compact fluorescent lamps. Its unique parabolic reflector and cross-baffle assembly provides precise optical control with very low aperture brightness. Shielding angles are 32° parallel to and 40° perpendicular to the lamps. Recess depth is only 4 3/4".

One housing allows interchangeable use of downlight and wallwash reflectors, permitting housings to be installed first and reflectors to be installed or changed at any time.

Super Baflux 226/8 uses two 26-watt, 4-pin lamps providing 3600 lumens (nearly as many as a 200-watt incandescent), a 10,000-hour life, a color rendering index (CRI) of 85, and color temperatures as warm as 2700°K (nearly duplicating the color qualities of incandescent).

Reflector assemblies are available in clear natural aluminum and champagne gold with anti-iridescent anodizing, as well as in pewter, bronze and white enamel finishes. Wallwash reflectors are also available.

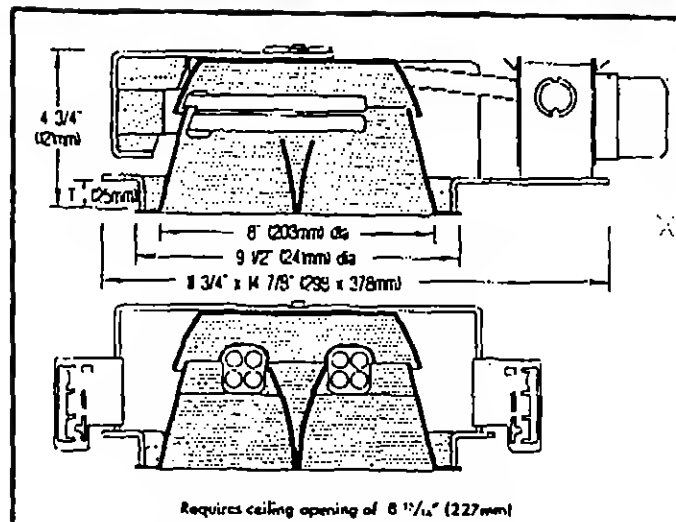
Super Baflux 226/8 includes a pair of mounting bars (1/2" x 27" C channel). Specialty bars for wood joist and T-bar installations are available as accessories.



APPLICATIONS

- Fixture is recommended for downlighting or wallwashing in nearly all architectural environments, especially those spaces where non-directional luminaires are preferred over rectangular troffers. These include offices, lobbies, corridors, restrooms and public areas. The shallow recess depth allows mounting in constricted plenum situations.

Fixture is UL listed for Damp Location (may not be suitable for some outdoor environments). Fixture is union made I&EW and in compliance with the component based efficiency standards of the 1995 New York State Energy Conservation Code. Fixture is prewired with high power factor Class P electronic ballast and approved for eight #12 wire 75°C branch circuit pull-through wiring. Removal of the reflector allows access to the ballast and junction box.



In inaccessible ceilings, a total depth of 7 1/2" (191mm) is required to allow ballast removal.

PRODUCT CODE

For a complete product code, list the basic unit and select one code item from each of the following boxes.

Basic Unit SB 226/8

Reflector Type
Downlight no suffix
Wallwash WW

Voltage
120 volt service 120
277 volt service 277

Reflector and Flange Color
Clear COL Pewter POL
Champagne Gold GOL Bronze ZOL
Semi-specular Clear EOL White WOL
Standard reflector flange continues reflector finish. White painted flanges and custom painted flanges are available. Add WF (white flange) or CCF (custom color flange)

OPTIONS

Specify by adding to the basic unit.
Equipped with magnetic ballast. Use 2-pin lamps only (G-24D3 base) - MAG
Dimmable; with Lutron® Hi-lume® electronic dimming ballast; for use with Lutron controls (by others).
Not for outdoor application - DM
Emergency battery pack operates lamp in event of power outage. Not available with DWW reflector.
An additional 3 1/2" (89mm) is required to remove EM pack through aperture. No through wiring.
Not for outdoor application - EM
1/2" (3mm) thick prismatic acrylic lens within reflector - P
1/2" (3mm) thick diffuse white acrylic within reflector - D
1/2" (3mm) thick clear acrylic shield within reflector - PS

► For combinations of the Options above, contact factory or Edison Price Lighting representative.

EDISON PRICE
LIGHTING

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SUPER BAFLUX 226/8

B/B₁

PHOTOMETRIC REPORT

Independent Testing Laboratories Report No. 39126

Luminaire recessed compact fluorescent downlight with white top reflector;
specular formed main reflector, specular parabolic cross-baffle

Lamps two 26-watt quad, 4-pin, G24q-3 base, 1800 lumens each

Efficiency 47.5%

Spacing Criteria 0°-1.2, 90°-1.2, 180°-1.3

BALLAST INFORMATION

Voltage	120	277
Input Watts	54	59
Line Current (A)	.45	.22
Power Factor (%)	>99	>99
Min. Starting Temp. (°F)	0	0

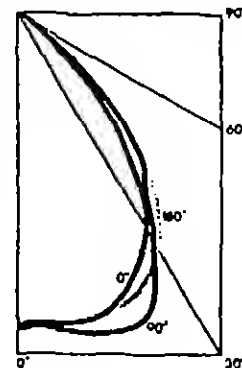
*Consult lamp manufacturers for specific temperatures.

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixture
0 - 30°	686	24.6	51.8
0 - 40°	1366	37.9	79.9
0 - 60°	1708	47.4	100.0
0 - 90°	1709	47.5	100.0
90 - 180°	0	0.0	0.0
0 - 180°	1709	47.5	100.0

CANDLEPOWER DISTRIBUTION (Candela)

Vertical Angle	Horizontal Angle				
	0.0	45.0	90.0	135.0	180.0
0	1055	1055	1055	1055	1055
5	1060	1060	1060	1057	1053
15	1055	1075	1110	1105	1059
25	938	1021	1064	1086	997
35	686	743	733	862	799
45	302	305	415	415	442
55	19	37	25	67	85
65	0	0	0	0	0
75	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0



LUMINANCE DATA (Candela/m²)

Vertical Angle	Average 0° Latitude	Average 90° Latitude	Average 180° Latitude
45	13165	18095	19270
55	1020	1343	4570
65	0	0	0
75	0	0	0
85	0	0	0

To convert cd/m² to footlamberts, multiply by 0.2919.

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Effective Floor Cavity Reflectance 20%

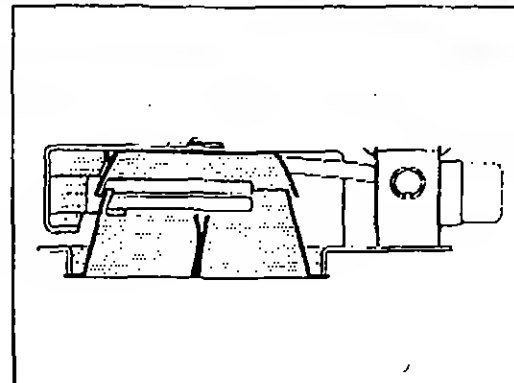
Ceiling Reflectance (%)	80				70				50				30				10				0
Wall Reflectance (%)	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
Room Cavity Ratio																					
0	57	57	57	57	55	55	55	55	53	53	53	51	51	51	48	48	48	48	48	48	48
1	54	52	51	50	52	51	50	49	49	48	47	47	47	46	46	45	45	44	44	44	44
2	50	48	46	44	49	47	45	43	45	44	42	44	43	41	43	42	41	40	40	40	40
3	47	44	41	39	46	43	41	39	42	40	38	41	39	38	40	38	37	36	36	36	36
4	44	40	37	35	44	40	37	35	39	36	34	38	36	34	37	35	34	33	33	33	33
5	42	37	34	32	41	37	34	32	36	33	31	35	33	31	34	32	31	30	30	30	30
6	39	34	31	29	38	34	31	29	33	30	28	32	30	28	32	30	28	27	27	27	27
7	37	32	29	26	36	31	28	26	31	28	26	30	28	26	30	27	26	25	25	25	25
8	35	29	26	24	34	29	26	24	29	26	24	28	26	24	28	25	24	23	23	23	23
9	33	27	24	22	32	27	24	22	27	24	22	26	24	22	26	23	22	21	21	21	21
10	31	26	22	20	30	25	22	20	25	22	20	25	22	20	24	22	20	19	19	19	19

SUPER BAFLUX 226/8 WW

WALLWASH INFORMATION

Distance From Ceiling (feet)	2'6" From Wall; 2'6" O.C.		3' From Wall; 3' O.C.		4' From Wall; 3'6" O.C.	
	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures	Below Fixture	Between Fixture
1	13	12	8	6	4	3
2	26	27	15	15	7	7
3	31	35	21	23	11	12
4	30	32	21	24	14	15
5	26	26	21	22	14	16
6	21	21	19	18	14	15
7	17	16	16	15	14	13
8	13	13	13	12	12	12
9	10	10	10	10	11	10
10	8	8	8	8	9	9
11	7	6	7	7	8	8
12	5	5	6	6	6	6

All vertical footcandles are initial values with no contribution from ceiling or floor reflectances. Computation performed with a total of five wallwashers.



WASHLUX® 126/6 226/6

recessed compact fluorescent lensed wallwashers

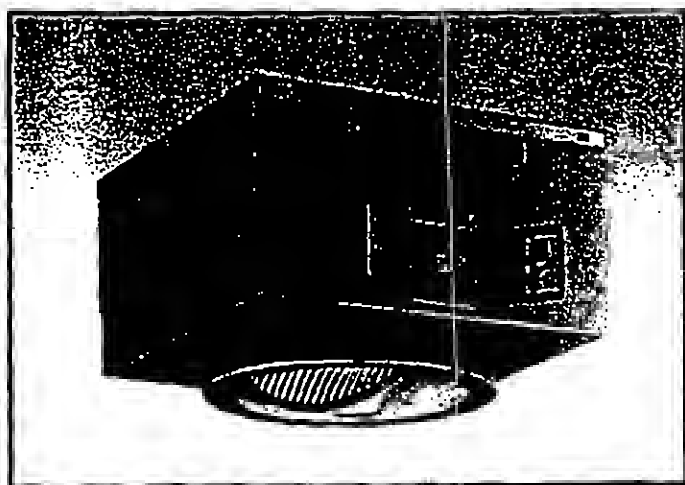
FEATURES

Washlux 126/6 and 226/6 are efficient compact fluorescent wallwashers which provide uniform illumination on vertical surfaces up to the ceiling line. The fixtures have a two-part internal reflector, a 55° gloss spread lens, and an external Darklite® reflector designed to minimize aperture brightness. Aperture diameter is 6 1/2" and recess depth is only 6 3/4".

Washlux 126/6 uses a 26-watt, 4-pin lamp and consumes a total of only 26 watts when operated at 120 volts. Washlux 226/6 uses two lamps for additional illumination, consuming 60 watts when operated at 120 volts. Compact fluorescent lamps have a 10,000-hour life, a color rendering index (CRI) of 85, and are available in a range of color temperatures as warm as 2700°K (nearly duplicating the color qualities of incandescent).

Reflectors are available in clear natural aluminum or champagne gold with anti-iridescent anodizing. Specular black reflectors are also available.

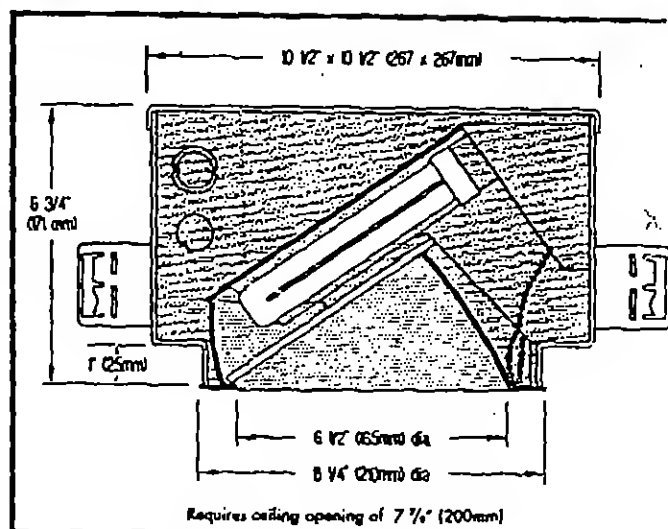
Both fixtures include a pair of mounting bars (3/4" x 27" C channel). Specialty bars for wood joist and T-bar installations are also available.



APPLICATIONS

Fixtures are recommended for wallwashing in offices, stores, lobbies and public areas. The use of matte wall finishes is recommended to avoid specular reflections.

Fixtures are UL listed for Damp Location (may not be suitable for some outdoor environments). Fixtures are union made IBEW and in compliance with the component based efficiency standards of the 1995 New York State Energy Conservation Code. Fixtures are prewired and approved for eight #12 wire 75°C branch lighting circuit pullthrough wiring. High power factor Class P electronic ballast is standard. Access to the ballast and wiring compartment is provided by removing a snap-in cover. Access to plenum is provided by opening a 5 1/4" square panel.



PRODUCT CODE

For a complete product code, list the basic unit and select one code item from each of the following boxes.

Basic Unit WLX 126/6 or WLX226/6

Voltage	
120 volt service	120
277 volt service	277

Reflector and Flange Color	Overlap	Flush
Clear	COL	CFL
Champagne Gold	GOL	GFL
Semi-specular Clear	EOL	EFL
Black	BOL	BFL

Standard reflector flange continues reflector field. White painted flanges and custom painted flanges are available. Add WF (white flange) or CCF (custom color flange).

Example: WLX 226/6 120 COL is the complete product code for a two-lamp fixture with a clear overlap reflector, suitable for 120 volt operation.

OPTIONS

Specify by adding to the end of the basic unit.

Equipped with magnetic ballast; use 2-pin lamps only (G24-D3 base) - MAG

Dimmable; with Lutron® HiLume® electronic dimming ballast; for use with Lutron controls (by others). Recess depth increases to 8 3/4" (213mm), plus an additional 3 1/2" (89mm) to remove ballast through aperture.

Not for outdoor application - DM

Emergency battery pack operates one lamp in case of power outage. Recess depth increases to 8 1/2" (216mm), plus an additional 3 1/2" (89mm) to remove EM pack through aperture. Not for outdoor application - EM

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1 13

WASHLUX 126/6

"C"

PHOTOMETRIC REPORT

Independent Testing Laboratories Report No. 36622

Luminaire recessed compact fluorescent lensed wallwasher

Lamp one 26-watt quad, 4-pin, G24q-3 base, 1800 lumens

WALLWASH INFORMATION

Distance From Ceiling (feet)	3' From Wall; 3' O.C.		3'6" From Wall; 3' O.C.		4' From Wall; 3' O.C.	
	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures
1	11	10	7	7	6	5
2	16	15	12	12	10	10
3	16	16	14	14	12	12
4	14	15	13	14	12	12
5	12	12	12	12	11	11
6	9	9	10	10	10	10
7	8	8	8	8	8	8
8	6	6	7	7	7	7
9	5	5	5	5	6	6

All vertical footcandles are initial values with no contribution from ceiling or floor reflectances. Computation performed with a total of five wallwashers.

BALLAST INFORMATION

Voltage	120	277
Input Watts	26	25
Line Current (A)	.22	.09
Power Factor (%)	>99	>99
Min. Starting Temp* (°F)	0	0

*Consult lamp manufacturers for specific temperatures.

WASHLUX 226/6

PHOTOMETRIC REPORT

Independent Testing Laboratories Report No. 36623

Luminaire recessed compact fluorescent lensed wallwasher

Lamps two 26-watt quad, 4-pin, G24q-3 base, 1800 lumens each

WALLWASH INFORMATION

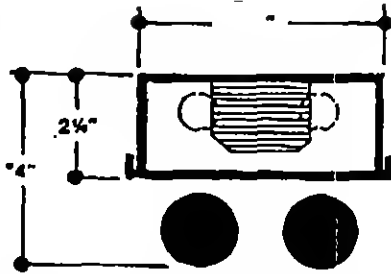
Distance From Ceiling (feet)	3' From Wall; 3' O.C.		3'6" From Wall; 3' O.C.		4' From Wall; 3' O.C.	
	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures	Below Fixture	Between Fixtures
1	14	14	9	9	6	5
2	25	25	25	19	19	11
3	26	27	23	23	15	15
4	23	23	22	22	15	15
5	19	19	19	19	14	14
6	15	15	16	16	12	12
7	12	12	13	13	10	10
8	10	10	11	11	9	9
9	8	8	9	9	7	7
10	7	7	7	7	6	6
11	6	6	6	6	5	5
12	5	5	5	5	5	5

All vertical footcandles are initial values with no contribution from ceiling or floor reflectances. Computation performed with a total of five wallwashers.

BALLAST INFORMATION

Voltage	120	277
Input Watts	54	59
Line Current (A)	.45	.22
Power Factor (%)	>99	>99
Min. Starting Temp* (°F)	0	0

*Consult lamp manufacturers for specific temperatures.

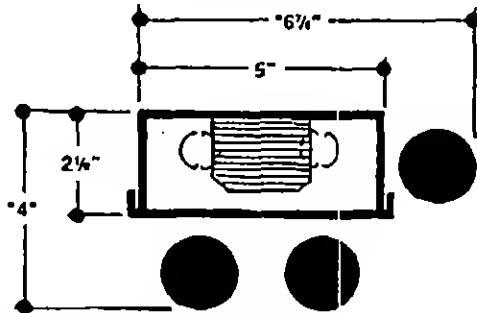
**Series
2500**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2500-215	2-15W-TS	18"
2500-220	2-20W-TS	24"
2500-230	2-30W-RS	36"
2500-230-6T	4-30W-RS	72"
2500-240	2-40W-RS	48"
2500-240-8T	4-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

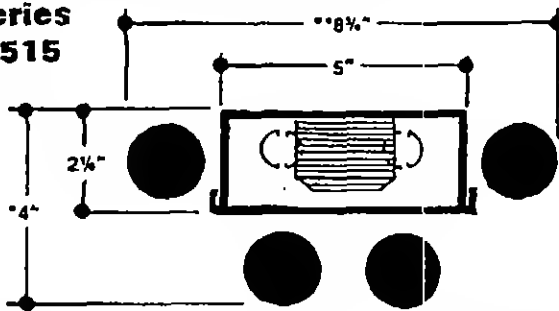
**Series
2510**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2510-315	3-15W-TS	18"
2510-320	3-20W-TS	24"
2510-330	3-30W-RS	36"
2510-330-6T	6-30W-RS	72"
2510-340	3-40W-RS	48"
2510-340-8T	6-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

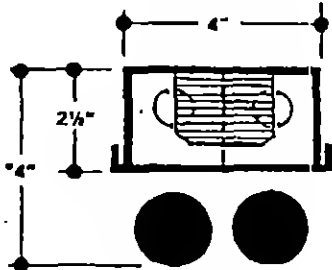
**Series
2515**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2515-415	4-15W-TS	18"
2515-420	4-20W-TS	24"
2515-430	4-30W-RS	36"
2515-430-6T	8-30W-RS	72"
2515-440	4-40W-RS	48"
2515-440-8T	8-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

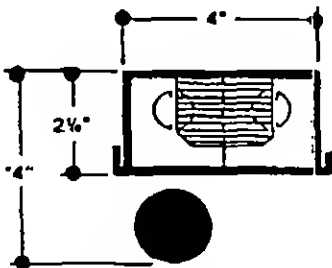
**Series
2420****STAGGERED CHANNELS**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2420-215	2-15W-TS	21"	3"
2420-220	2-20W-TS	27"	3"
2420-230	2-30W-RS	39"	3"
2420-240	2-40W-RS	51"	3"
2420-240-8T	4-40W-RS	89"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

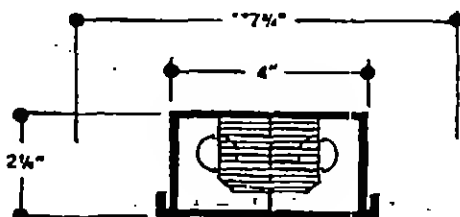
**Series
2430**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2430-115	1-15W-TS	18"	3"
2430-120	1-20W-TS	24"	3"
2430-130	1-30W-RS	36"	3"
2430-140	1-40W-RS	48"	3"
2430-140-8T	2-40W-RS	96"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

**Series
2435**

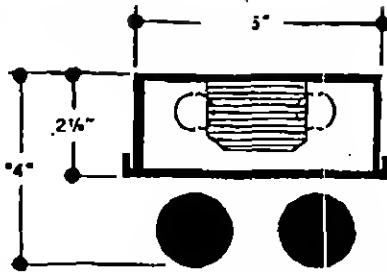
CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2435-215	2-15W-TS	21"	3"
2435-220	2-20W-TS	27"	3"
2435-230	2-30W-RS	39"	3"
2435-240	2-40W-RS	51"	3"
2435-240-8T	4-40W-RS	89"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

For options see page 5.

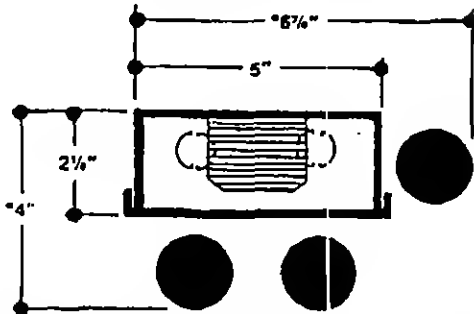
**Series
2500**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2500-215	2-15W-TS	18"
2500-220	2-20W-TS	24"
2500-230	2-30W-RS	36"
2500-230-6T	4-30W-RS	72"
2500-240	2-40W-RS	48"
2500-240-6T	4-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

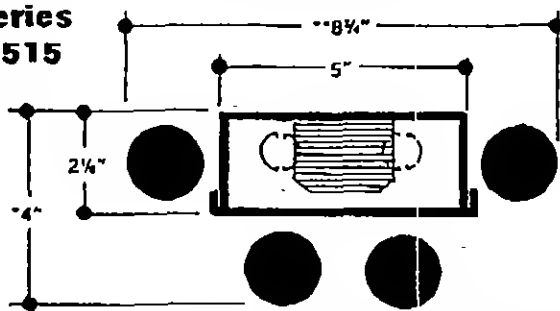
**Series
2510**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2510-315	3-15W-TS	18"
2510-320	3-20W-TS	24"
2510-330	3-30W-RS	36"
2510-330-6T	6-30W-RS	72"
2510-340	3-40W-RS	48"
2510-340-6T	6-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

**Series
2515**

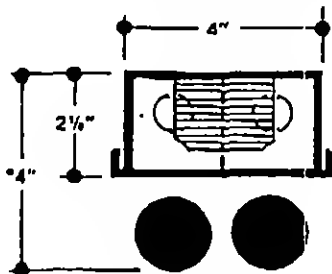
CAT. NO.	NO. AND TYPE LAMPS	LENGTH
2515-415	4-15W-TS	18"
2515-420	4-20W-TS	24"
2515-430	4-30W-RS	36"
2515-430-6T	6-30W-RS	72"
2515-440	4-40W-RS	48"
2515-440-6T	6-40W-RS	96"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

**Minus 1/2" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

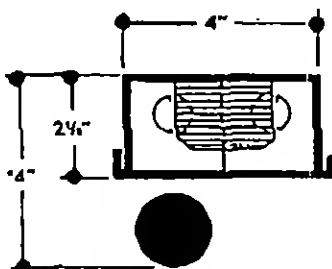
**Series
2420****STAGGERED CHANNELS**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2420-215	2-15W-TS	21"	3"
2420-220	2-20W-TS	27"	3"
2420-230	2-30W-RS	39"	3"
2420-240	2-40W-RS	51"	3"
2420-240-6T	4-40W-RS	99"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

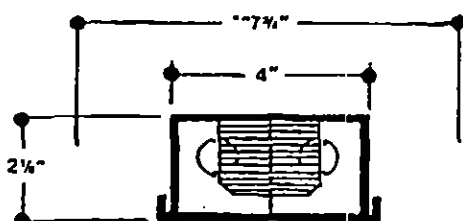
**Series
2430**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2430-115	1-15W-TS	18"	3"
2430-120	1-20W-TS	24"	3"
2430-130	1-30W-RS	36"	3"
2430-140	1-40W-RS	48"	3"
2430-140-6T	2-40W-RS	96"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

**Series
2435**

CAT. NO.	NO. AND TYPE LAMPS	LENGTH	
		O.A.	STAGGER
2435-215	2-15W-TS	21"	3"
2435-220	2-20W-TS	27"	3"
2435-230	2-30W-RS	39"	3"
2435-240	2-40W-RS	51"	3"
2435-240-6T	4-40W-RS	99"	3"

Dimensions shown are with T-12 lamps.

*Minus 1/4" for OCTRON™ T-8 lamps.

To specify OCTRON™ ballast, add suffix "ESB/OCT" or "ESB/EBO" to cat. no.

LUMEN MICRO

The World Trade Center
Elevator Lobby and Corridor Upgrade
Corridor Emergency Lighting Analysis

REPORT FOR:

The Port Authority

REPORT BY:

SM

Cosentini Associates

VERSION 6.0

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2540 FRONTIER AVE. SUITE #107, BOULDER, CO. 80301

DESIGN FILE: PA2.DES

RADIR	.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
.0	830.	630.	430.	230.	30.	30.	30.	30.	30.
5.0	837.	645.	450.	250.	41.	235.	226.	210.	209.
10.0	850.	669.	463.	271.	62.	272.	240.	213.	207.
15.0	863.	693.	471.	287.	80.	254.	230.	216.	204.
20.0	871.	707.	474.	296.	97.	232.	213.	219.	202.
25.0	883.	721.	480.	303.	112.	209.	192.	216.	200.
30.0	891.	734.	483.	308.	126.	186.	175.	219.	197.
35.0	900.	748.	486.	310.	138.	164.	152.	209.	195.
40.0	923.	767.	492.	314.	149.	140.	130.	200.	190.
45.0	932.	784.	493.	318.	158.	118.	110.	190.	184.
50.0	942.	793.	490.	321.	165.	96.	92.	180.	176.
55.0	950.	801.	482.	323.	170.	73.	68.	175.	170.
60.0	951.	808.	476.	324.	174.	50.	45.	170.	164.
65.0	954.	814.	470.	324.	176.	27.	23.	165.	158.
70.0	958.	819.	463.	323.	177.	4.	0.	160.	152.
75.0	963.	824.	456.	321.	177.	0.	0.	155.	146.
80.0	968.	829.	448.	318.	176.	0.	0.	150.	140.
85.0	973.	834.	440.	314.	174.	0.	0.	145.	134.
90.0	978.	839.	432.	309.	171.	0.	0.	140.	128.

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LUMEN MICRO VERSION 6.0

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DESIGN FILE: PA2.DES

SUBLAYOUT NUMBER..... 1

AIMING ANGLES OF LUMINAIRE:

ROTATION OF ZERO DEGREE PLANE.. .00

TILT ANGLE FROM NADIR..... .00

SPIN ANGLE..... .00

X, Y, Z DIMENSIONS ACTUALLY USED.. .58 .58 .00

LUMINOUS SIDES ACTUALLY USED..... NONE

SUSPENSION LENGTH..... .00

NUMBER OF COLUMNS..... 2

NUMBER OF ROWS..... 2

COLUMN

COORD. 63.00 68.00

ROW

COORD. 2.00 7.00

LUMINAIRE NUMBER..... 2

DESCRIPTION..... LAMP CODE : F4CBX/SPX35/RS

FROM DATABASE FILE..... A:\202DRAZY.IES

DATABASE NUMBER..... 1

TOTAL INPUT WATTS..... 71.0

X, Y AND Z DIMENSIONS... 1.84 1.92 .00

UNITS FOR DIMENSIONS.... FEET

CANDLEPOWER MULTIPLIER.. .60

LAMP(S) DESCRIPTION.....

NUMBER OF LAMPS..... 2

LUMENS EACH..... 3150.

NUMBER OF SUBLAYOUTS.... 1

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DESIGN FILE: PA2.DES

CANDLEPOWER VALUES, IN CANDELAS:
(VALUES SCALED BY ALL FACTORS)

ANGLE					
FROM	ANGLE FROM ZERO DEGREE PLANE				
MADIR	0	22.5	45.0	67.5	90.0
0	711.	711.	711.	711.	711.
5.0	709.	707.	708.	737.	701.
10.0	699.	696.	698.	698.	694.
15.0	675.	676.	678.	631.	677.
20.0	650.	649.	655.	635.	653.
25.0	613.	610.	618.	624.	623.
30.0	572.	574.	579.	549.	590.
35.0	524.	527.	536.	546.	550.
40.0	470.	474.	493.	508.	516.
45.0	416.	415.	442.	468.	479.
50.0	350.	361.	392.	426.	439.
55.0	286.	299.	346.	386.	400.
60.0	221.	247.	294.	344.	360.
65.0	177.	194.	251.	299.	322.
70.0	127.	145.	200.	250.	277.
75.0	86.	93.	146.	202.	232.
80.0	44.	47.	82.	112.	138.
85.0	13.	12.	14.	23.	26.
90.0	0.	0.	0.	0.	0.

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DESIGN FILE: PA2.DES

SUBLAYOUT NUMBER..... 1
AIMING ANGLES OF LUMINAIRE:
ROTATION OF ZERO DEGREE PLANE.. .00
TILT ANGLE FROM NADIR..... .00
SPIN ANGLE..... .00
X, Y, Z DIMENSIONS ACTUALLY USED.. 1.89 1.92 .00
LUMINOUS SIDES ACTUALLY USED..... NONE
SUSPENSION LENGTH..... .00
NUMBER OF COLUMNS..... 2
NUMBER OF ROWS..... 1

COLUMN

COORD. 3.00 49.00

ROW

COORD. 4.50

TOTAL NUMBER OF LUMINAIRES..... 6
TOTAL WATTS INPUT TO LUMINAIRES.. 278.0
TOTAL WATTS PER UNIT AREA..... 441

PHOTOMETRIC AND GEOMETRIC UNITS: ENGLISH

ROOM DIMENSIONS:

EAST-WEST.... 70.00
NORTH-SOUTH.. 9.00
HEIGHT..... 9.00

ROOM SURFACE REFLECTANCES:

SURFACE REFLECTANCE

NORTH .50
EAST .50
SOUTH .50
WEST .50
FLOOR .20
CEILING .80

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DESIGN FILE: PA2.DES

AVERAGE ROOM SURFACE EXITANCES (lumens/ft²)

SURFACE	AVERAGE EXITANCE
NORTH	1.21
EAST	5.08
SOUTH	3.09
WEST	5.05
FLOOR	2.18
CEILING	2.43

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DESIGN FILE: PA2.DES

ILLUMINANCE (footcandles)

WORKING PLANE HEIGHT: 2.50

AVERAGE: 12.9 MINIMUM: 2.07 MAXIMUM: 65.0 MEAN DEVIATION: 10.8

ABS. Y ABSOLUTE X-COORDINATE(S)

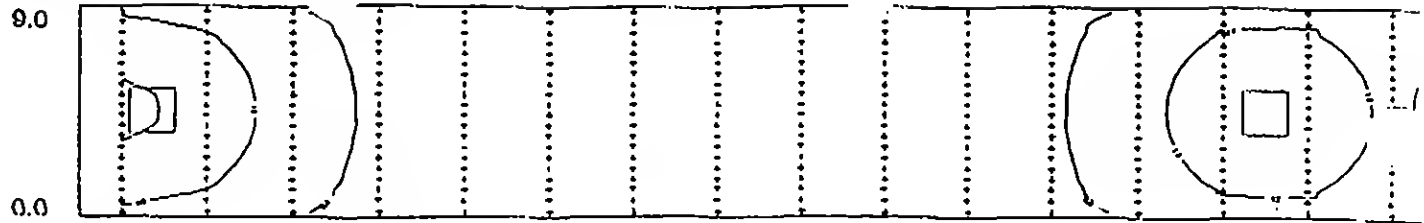
COORD.

1.75 5.25 8.75 12.25 15.75 19.25 22.75 26.25 29.75 33.25 36.75 40.25 43.75 47.25 50.75 54.25 57.75 61.25 64.75 68.25

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8.77 * 11.0 9.42 5.50 3.49 2.61 2.28 2.12 2.07 2.23 2.30 2.70 3.81 5.88 9.57 9.65 6.80 12.0 29.8 45.9 36.1
8.32 * 12.1 10.7 6.23 3.82 2.86 2.52 2.31 2.28 2.44 2.51 2.95 4.17 6.60 10.9 11.3 7.57 13.1 32.8 50.4 38.1
7.87 * 13.1 11.5 6.46 3.95 2.84 2.49 2.30 2.24 2.34 2.47 2.92 4.13 6.91 11.9 12.1 7.87 13.6 34.4 52.9 39.7
7.42 * 14.2 12.5 6.82 3.99 2.91 2.54 2.35 2.29 2.38 2.53 3.00 4.24 7.30 12.9 13.1 8.28 14.3 35.9 56.4 41.7
6.97 * 15.4 13.4 7.06 4.02 2.90 2.51 2.33 2.27 2.34 2.51 2.99 4.26 7.58 13.9 14.1 8.58 14.9 37.2 57.6 43.4
6.52 * 16.4 14.3 7.31 4.09 2.93 2.53 2.35 2.29 2.35 2.52 3.01 4.33 7.86 14.9 15.0 8.89 15.5 38.5 59.9 45.8
6.07 * 17.5 15.1 7.55 4.17 2.98 2.57 2.39 2.32 2.39 2.56 3.06 4.42 8.16 15.6 15.9 9.20 16.1 39.6 61.9 47.1
5.62 * 18.1 15.7 7.69 4.19 2.98 2.55 2.38 2.32 2.37 2.56 3.07 4.45 8.34 16.5 16.6 9.41 16.4 40.7 63.2 48.4
5.17 * 18.7 16.2 7.84 4.26 3.02 2.59 2.41 2.35 2.41 2.60 3.11 4.51 8.51 17.0 17.1 9.60 16.6 41.4 64.2 49.7
4.72 * 18.9 16.3 7.88 4.26 3.01 2.58 2.40 2.33 2.39 2.58 3.10 4.51 8.56 17.2 17.3 9.66 16.7 41.8 64.7 49.9
4.27 * 18.9 16.3 7.88 4.26 3.01 2.58 2.40 2.33 2.39 2.58 3.10 4.51 8.56 17.2 17.3 9.67 16.6 41.9 65.0 49.8
3.82 * 18.8 16.2 7.88 4.29 3.05 2.62 2.44 2.37 2.43 2.62 3.14 4.54 8.55 17.0 17.2 9.65 16.6 41.8 65.0 49.4
3.37 * 18.1 15.7 7.67 4.20 2.99 2.56 2.38 2.32 2.30 2.56 3.08 4.46 8.34 16.4 16.6 9.42 16.2 41.1 63.9 47.7
2.92 * 17.4 15.1 7.55 4.10 2.99 2.59 2.40 2.33 2.40 2.57 3.07 4.43 8.16 15.7 15.9 9.20 15.7 40.0 62.1 45.8
2.47 * 16.4 14.2 7.37 4.11 2.95 2.54 2.36 2.30 2.36 2.54 3.03 4.34 7.87 14.8 15.0 8.88 15.1 38.4 59.6 43.6
2.02 * 15.1 13.3 7.06 4.04 2.92 2.53 2.35 2.29 2.36 2.52 3.00 4.26 7.57 13.9 14.0 8.55 14.4 36.7 56.9 41.6
1.57 * 14.2 12.5 6.82 4.01 2.93 2.56 2.37 2.31 2.40 2.55 3.02 4.26 7.29 12.9 13.1 8.24 13.9 35.0 54.2 39.6
1.12 * 13.0 11.5 6.50 3.88 2.67 2.51 2.32 2.27 2.37 2.49 2.95 4.16 6.91 11.6 12.0 7.82 13.1 33.0 51.0 37.2
.67 * 12.0 10.6 6.24 3.85 2.89 2.56 2.36 2.31 2.42 2.54 2.98 4.20 6.60 10.9 11.1 7.50 12.5 30.9 47.8 34.9
.22 * 10.9 9.35 5.60 3.52 2.64 2.31 2.16 2.10 2.26 2.35 2.73 3.24 5.85 9.50 9.75 6.73 11.2 27.9 43.2 30.4

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Analysis: Horizontal Illuminance

Scale: 0.125 = 1.00

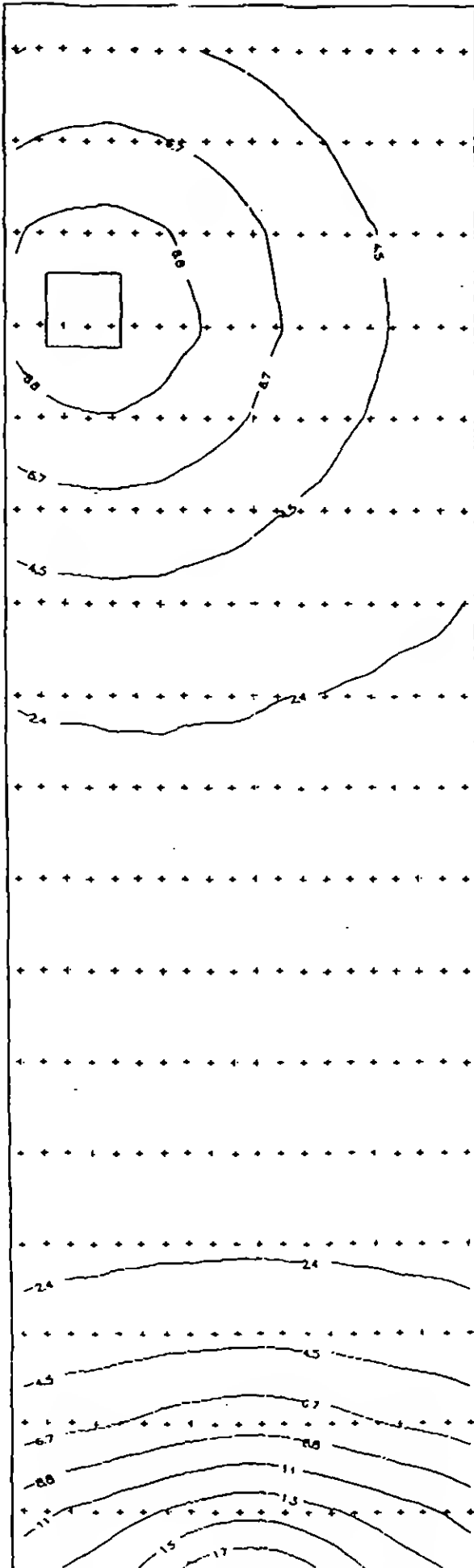
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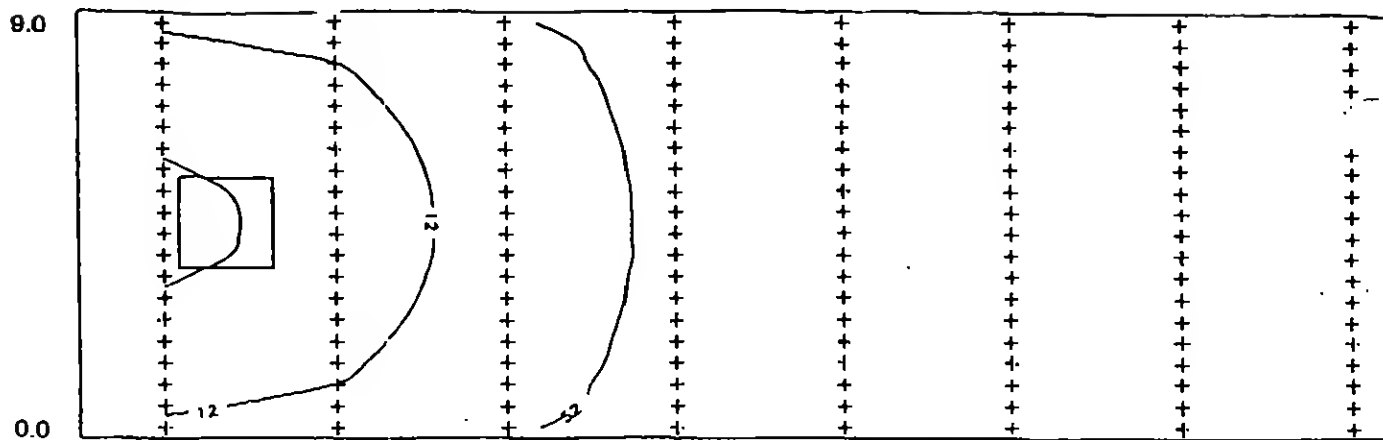
Units: footcandles

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48.0



ELEVATION LOBBY



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Analysis: Horizontal Illuminance

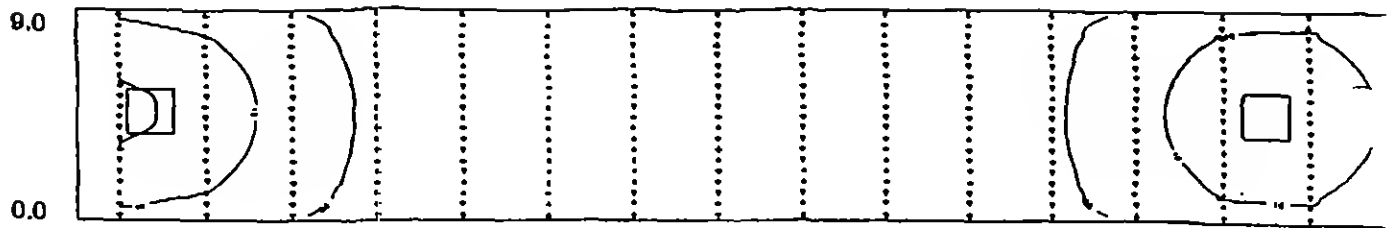
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Surface: Grid 1

Design File: PA2

Units: footcandles

CORRIDOR



0.0

Analysis: Horizontal Illuminance

Scale: 0.125 = 1.00

Surface: Grid 1

Design File: PA2

Units: footcandles

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CORRIDOR



**THE POST ACTIVITY OF
OF NY 6215**

SOME OTHER COMMON ANSWERS

Boston Office
100 Longfellow Street, New York, NY 10013
Tel: 212 697-8000, Fax: 212 697-8001, e-mail: info@wiley.com

Summary: The authors present a new method for the analysis of the relationship between the variables of the model. The method is based on the use of the principal component analysis (PCA) technique. The results show that the model is valid and that the variables are related. The authors conclude that the model is a good tool for the analysis of the relationship between the variables of the model.

	World Trade Planning
--	-------------------------

World Trade					
Center					

2 WTC
78TH FLOOR
CORRIDOR AND
TOILET UPGRADE

Day	Date	Hour	Page
1	10/10/10	10:00	10
2	10/11/10	10:00	11
3	10/12/10	10:00	12
4	10/13/10	10:00	13
5	10/14/10	10:00	14
6	10/15/10	10:00	15
7	10/16/10	10:00	16
8	10/17/10	10:00	17
9	10/18/10	10:00	18
10	10/19/10	10:00	19
11	10/20/10	10:00	20
12	10/21/10	10:00	21
13	10/22/10	10:00	22
14	10/23/10	10:00	23
15	10/24/10	10:00	24
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61	12/09/10	10:00	70
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82	12/30/10	10:00	91
83	12/31/10	10:00	92
84	01/01/11	10:00	93
85	01/02/11		

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DO CH _____
Designed by Drawn by Book Layout

A/17/94 JED _____
Date Checked By _____

Control Number	Study Number
	E1780

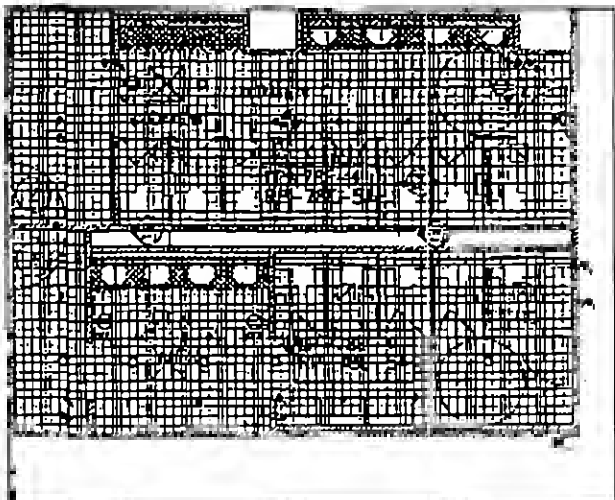
STALLATION PART PLAN

LIGHTING PICTURE LIST				
Description of Picture	No.	Time		Remarks
		Start	End	
REAR VIEW OF THE BUILDING	1	7:00	7:15	SPECIFY TYPE BALLAST
REAR VIEW OF THE BUILDING	2	7:15	7:30	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	3	7:30	7:45	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	4	7:45	8:00	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	5	8:00	8:15	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	6	8:15	8:30	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	7	8:30	8:45	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	8	8:45	9:00	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	9	9:00	9:15	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	10	9:15	9:30	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	11	9:30	9:45	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	12	9:45	10:00	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	13	10:00	10:15	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	14	10:15	10:30	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	15	10:30	10:45	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	16	10:45	11:00	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	17	11:00	11:15	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	18	11:15	11:30	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	19	11:30	11:45	SPECIFY TYPE BALLAST
FRONT VIEW OF THE BUILDING	20	11:45	12:00	SPECIFY TYPE BALLAST

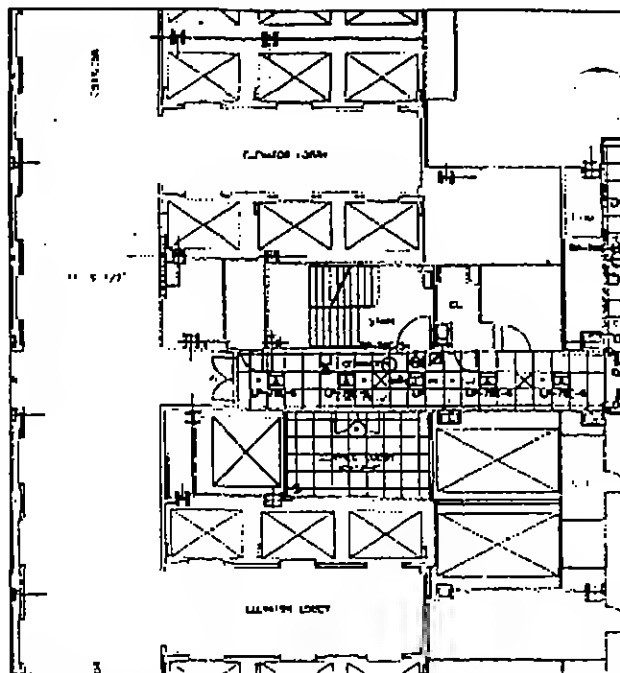
TABLE 1

1. LIGHT FIXTURES MUST BE APPROVED PER LEE 18 WFL
2. WIRE EXCESS/NO FIXTURES FOR 120V.
3. INSTANT 120V 1/2" BORE BLACK PIPING HOLES IN CEILING OF 12" DIAMETER, AND 18" MAXIMUM.
4. TOP INSULATION AND VENTING DIFFERENTIATE LIGHTING
5. WHEN ALL LIGHTING FIXTURES, WITHIN THE ROOM ARE TO BE CONNECTED TO A SINGLE CIRCUIT (CIRCUIT FOR EXCESS/NO FIXTURES), THE LIGHTING CIRCUIT MUST BE IDENTIFIED BY A SIGN ABOVE THE ELECTRICAL CIRCUIT NUMBER.
6. WHEN ALL RECEPTALS WITHIN THE ROOM ARE TO BE SUPPLIED BY A SINGLE CIRCUIT, THE CIRCUIT NUMBER APPEARS ON A SIGN TO THE LEFT OF THE CIRCUIT NUMBER.
7. CIRCUITS ALL INDICATED ON FIXTURES AND CEILING LIGHTS TO EXPOSED-1. THE 1/2" BORE CIRCUIT IS GENERALLY UNAVAILABLE FOR THE RECEPTIONS MUST BE IDENTIFIED BY A CORRESPONDING 1/2" BORE CIRCUIT NUMBER.

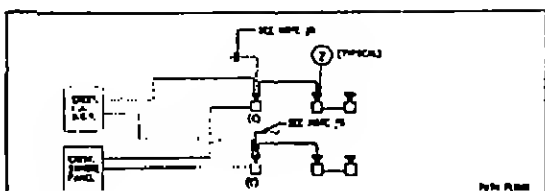
ISSUE FOR 100%
CLIENT REVIEW



TOILET POWER AND LIGHTING
INSTALLATION PART PLAN
SCALE: 1/4"=1'



CORRIDOR POWER AND LIGHTING
SCALE: 1/8"=1'



Week:

- [illegible]

Results

1. ALL SPEAKER SHALL BE TYPICAL SPEAKERS AND MOUNTED. CABLE SHALL BE RATED WITH TESTS AND SHALL BE 90% OR HIGHER APPROVED. SPEAKER CABLE SHALL TO 2 AND 4 AND MINIMUM AND STRONG CABLE SHALL BE 1/4" AND 1/2" MINIMUM.
2. ALL SPEAKER SHALL BE INSTALLED ON ELECTRIC WALLS. (EXCEPT WALL COLUMNS) BUT BE INSTALLED FOR SYSTEM LOW VOLTAGE WIRING. WIRING SHALL BE WIRING OF 1/2" COLUMNS.
3. AFTER TO PLACE PLANS FOR EXACT LOCATION OF THE PLAIN SPEAKERS AND STRONG.
4. THE ELECTRICAL WORK SHALL INCLUDE THE RESPONSIBILITY FOR ALL REQUIRED PLANS WITHIN THE BUILDING STRUCTURE, AND THE FIRE DEPARTMENT FOR ALL ADDITIONS TO THE BASE BUILDING SYSTEM. THE ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE BASE BUILDING SYSTEM. CONTRACTOR'S SHALL REVIEW THE ELECTRICAL CONTRACTOR'S WORKMANSHIP AND SIGN AND AS THE APPLICATION PREPARED BY THE ELECTRICAL CONTRACTOR, THE ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE BASE BUILDING SYSTEM. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE ELECTRICAL WORK, INCLUDING THE ELECTRICAL WORK, SPECIFICATIONS OF THE WORK, INCLUDING THE INSTALLATION AND TESTING OF ALL REQUIRED APPLICATION FORCE AND THE PAYMENT OF ALL PLANS WILL.
5. THE ELECTRICAL WORK SHALL BE INSTALLED IN CONNECTION WITH ANY FLOOR WITH THE BASE BUILDING SHALL TO SYSTEM, AND ALL ELECTRICAL WORK SHALL BE INSTALLED AND WORKMANSHIP OF SYSTEM NECESSARY FOR A COMPLETE SYSTEM. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE ELECTRICAL WORK, INCLUDING THE INSTALLATION AND TESTING OF ALL REQUIRED APPLICATION FORCE AND THE PAYMENT OF ALL PLANS WILL.
6. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE ELECTRICAL WORK, INCLUDING THE INSTALLATION AND TESTING OF ALL REQUIRED APPLICATION FORCE AND THE PAYMENT OF ALL PLANS WILL.

INTERVIEW

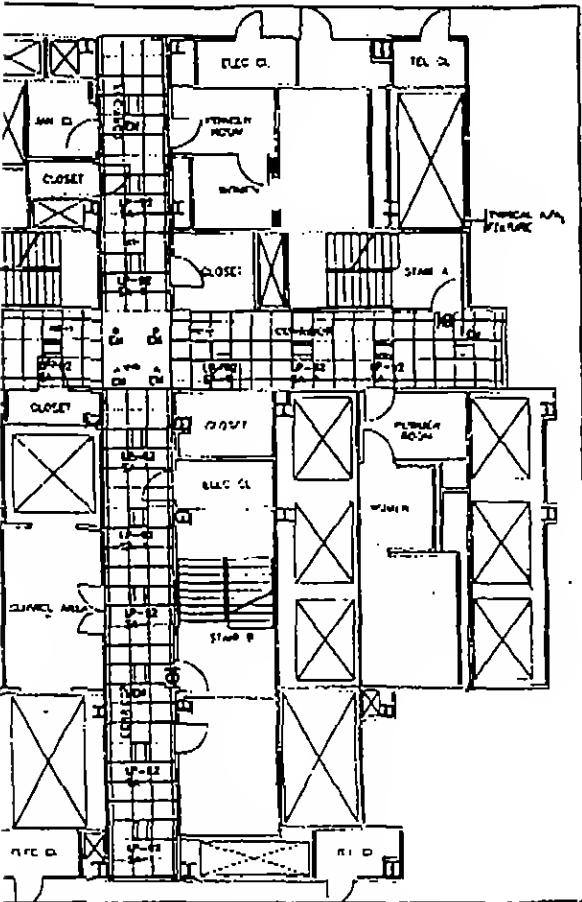
UPON ACTIVATION OF ANY AUTOMATIC OR MANUAL DE-ICE ON THIS FLOOR OR THE FLOOR BELOW THE FOLLOWING SHALL OCCUR:

1. ADDRESS AND VIBRATOR SIGNALS SHALL BE ACTIVATED AS THE FIRE COMMAND SECTION INDICATING
ZONE IN ALARM AND DETAILS ARE ALARM COMPLETION.

AUDIBLE VISUAL FIRE WARNING SYSTEM DETAIL
MULTIPLE FLOORS
(DIRECT CONNECTION TO EXISTING CLASS "C"
BASE BUILDING FIRE ALARM SYSTEM))

DETAIL

E178C



THE POST AUTHORITY
NEW YORK

SOME MORE CORREL. REQUIRED

Notes: Before Work Begins
 All Existing Work, Old Work, Old Work
 and Old Work, Old Work, Old Work, Old Work

Project No.

World Trade
Center

World Trade
Center

1 WTC
92ND FLOOR
CORRIDOR AND
LOBBY UPGRADE

NOTES:

1. LIGHT FIXTURES MUST BE APPROVED FOR USE IN WTC.
2. WIRE CLOSETS REQUIRED FOR 100V.
3. "OT" INDICATES LOW VOLTAGE OUTLET/LIGHTING.
4. WIRE CLOSETS AND EXIT LIGHTS OF THE NEAREST AVAILABLE CLOSET REQUIRED.
5. WIRE LIGHTS AS INDICATED IN 20 AMP CIRCUITS ON THE 100V 1 AND 3 POLE PANELS IN PANEL UP-100V. ON 100V (2) SPARE 20 AMP OF 100V PANELS AVAILABLE OF 1 AND 3 ARE ALREADY USED.

ISSUE FOR BID

Rev. Date Revision

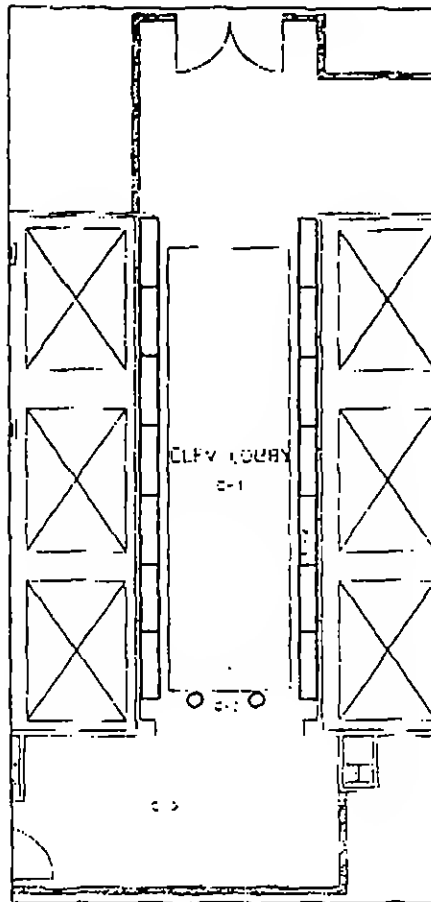
This drawing is subject to jurisdiction in accordance with the terms of the contract and the terms of the contract. It is not to be used for any other purpose without the written consent of the owner.

Prepared By: CS
Checked By: CS
Date: 3/10/98

Contract Number: 000
Order Number: 000

Contract Number: 000
Order Number: 000

E192C



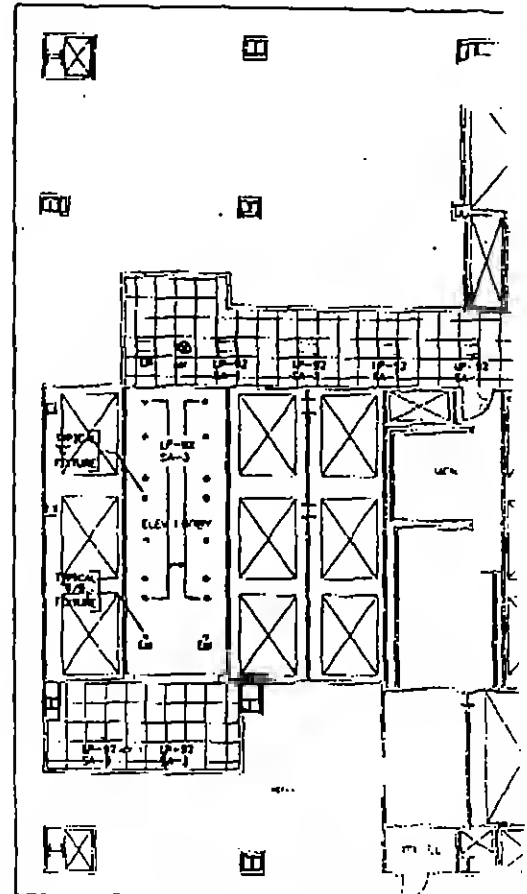
DEMOLITION PART PLAN
SCALE: 1/4"=1'

NOTES

1. REMOVE EXISTING LIGHTING FIXTURES AS SHOWN.
2. EXISTING LIGHT FIXTURES IN CORRIDORS SHALL BE REMOVED FOR RE-USE LATER (NOT SHOWN).
3. ALL LIGHTING RIGGING, JUNCTION BOXES, AND CONDUITS HAVE BEEN PREVIOUSLY REMOVED FROM CONDUITS.
4. RELOCATE CONDUITS AND JUNCTION BOXES USED TO FEED THE REMAINING EMERGENCY LIGHTS IN THE ELEVATOR LOBBY WILL REMAIN IN PLACE TO BE USED TO FEED REPLACEMENT EMERGENCY LIGHTING IN THE LOBBY, STAIRWELL AND STAIRS.

LEGEND

- INDICATE BOM LINE WITH BOM IN FLUORESCENT FIXTURES
- SINGLE 4" DIA FLUORESCENT FIXTURE



LIGHTING
SCALE: 1"=1'

LIGHTING FIXTURE LIST					
NO.	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL	REMARKS
1	1" X 4" RECESSED FLUORESCENT, 1-WAY IN CORRIDOR, 1-WAY IN LOBBY	2	277	554	SPECIFY 277V BALLAST
2	1" X 4" RECESSED FLUORESCENT, 1-WAY IN CORRIDOR, 1-WAY IN LOBBY	2	277	554	SPECIFY 277V BALLAST
3	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
4	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
5	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
6	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
7	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
8	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
9	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST
10	RECESSED 4" X 8" FLUORESCENT, 1-WAY	2	277	554	SPECIFY 277V BALLAST

6792C

LUMEN MICRO

World Trade Center
Corridor and Lobby Upgrade
Elevator Lobby Emergency Lighting Analysis

REPORT FOR:

The Port Authority

REPORT BY:

SM

Cosentini Associates

VERSION 6.0

COPYRIGHT (C) LIGHTING TECHNOLOGIES INC. 1993
2540 FRONTIER AVE. SUITE #107, BOULDER, CO. 80301

Cosentino Associates

LUMEN MICRO VERSION 6.0

COPYRIGHT (C) LIGHTING TECHNOLOGIES INC. 1993

DESIGN FILE: PAL.DES

ROOM CHARACTERISTICS

[illegible]

LONGHAIRE DESCRIPTION(S):

```

LUMINAIRE NUMBER..... 1
DESCRIPTION..... direct recessed compact fluorescent downlight, 8" round
FROM DATABASE FILE..... C:\LHV5\IES\EPI91\COMPFLU\BAF&COL.IES
DATABASE NUMBER..... 1
TOTAL INPUT WATTS..... 34.0
X, Y AND Z DIMENSIONS... .50 .50 .60
UNITS FOR DIMENSIONS... FEET
CANDLEPOWER MULTIPLIER... 1.60
LAMP(S) DESCRIPTION..... x FL3TT
    NUMBER OF LAMPS..... 2
    LUMENS EACH..... 900.
NUMBER OF SUBLAYOUTS.... 1

```

CANDLEPOWER VALUES, IN CANDELAS;
(VALUES SCALED BY ALL FACTORS)

ANGLE

FROM ANGLE FROM ZERO DEGREE PLANE

[illegible]

Cosentini Associates

LUMEN MICRO VERSION 6.0

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DESIGN FILE: PAL.DES

SUBLAYOUT NUMBER..... 1
AIMING ANGLES OF LUMINAIRE:
ROTATION OF ZERO DEGREE PLANE.. .00
TILT ANGLE FROM NADIR..... .00
SPIN ANGLE..... .00
X, Y, Z DIMENSIONS ACTUALLY USED.. .58 .58 .00
LUMINOUS SIDES ACTUALLY USED..... NONE
SUSPENSION LENGTH..... .00
NUMBER OF COLUMNS..... 2
NUMBER OF ROWS..... 1

COLUMN

COORD. 2.00 10.00

ROW

COORD. 4.00

LUMINAIRE NUMBER..... 2
DESCRIPTION..... LAMP CODE : F4CBX/SPX25/RS
FROM DATABASE FILE..... A:\202DRAZY.IES
DATABASE NUMBER..... 1
TOTAL INPUT WATTS..... 71.0
X, Y AND Z DIMENSIONS... 1.88 1.92 .00
UNITS FOR DIMENSIONS.... FEET
CANDLEPOWER MULTIPLIER.. .80
LAMP(S) DESCRIPTION.....
NUMBER OF LAMPS..... 2
LOMENS EACH..... 3150.
NUMBER OF SUBLAYOUTS.... 1

Cosentini Associates

LUMEN MICRO VERSION 6.0

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DESIGN FILE: PAL.DES

CANDLEPOWER VALUES, IN CANDELAS:

(VALUES SCALED BY ALL FACTORS)

ANGLE

FROM ANGLE FROM ZERO DEGREE PLANE

NADIR	.0	22.5	45.0	67.5	90.0
.0	711.	711.	711.	711.	711.
5.0	709.	707.	708.	707.	701.
10.0	699.	696.	698.	698.	694.
15.0	675.	676.	678.	681.	677.
20.0	650.	649.	655.	655.	653.
25.0	613.	610.	619.	624.	623.
30.0	572.	574.	579.	585.	590.
35.0	524.	527.	536.	546.	550.
40.0	470.	474.	493.	508.	516.
45.0	416.	415.	442.	468.	479.
50.0	350.	361.	392.	426.	438.
55.0	266.	299.	346.	396.	400.
60.0	221.	247.	294.	344.	360.
65.0	177.	194.	251.	299.	322.
70.0	127.	145.	200.	250.	277.
75.0	66.	93.	146.	202.	232.
80.0	44.	47.	82.	122.	138.
85.0	13.	12.	14.	23.	26.
90.0	0.	0.	0.	0.	0.

Cosentini Associates

LIMEX MICRO VERSION 6.0

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DESIGN FILE: PA1.DES

SUBLAYOUT NUMBER..... 1
AIMING ANGLES OF LUMINAIRE:
ROTATION OF ZERO DEGREE PLANE.. .00
TILT ANGLE FROM NADIR..... .00
SPIN ANGLE..... .00
X, Y, Z DIMENSIONS ACTUALLY USED.. 1.89 1.92 .00
LUMINOUS SIDES ACTUALLY USED..... NONE
SUSPENSION LENGTH..... .00
NUMBER OF COLUMNS..... 1
NUMBER OF ROWS..... 1

COLUMN

COOR. 2.00

ROW

COOR. 10.00

TOTAL NUMBER OF LUMINAIRES..... 3
TOTAL WATTS INPUT TO LUMINAIRES.. 119.0
TOTAL WATTS PER UNIT AREA..... .241

PHOTOMETRIC AND GEOMETRIC UNITS: ENGLISH

ROOM DIMENSIONS:

EAST-WEST.... 12.00
NORTH-SOUTH.. 48.00
HEIGHT..... 9.00

ROOM SURFACE REFLECTANCES:

SURFACE REFLECTANCE

NORTH .50
EAST .50
SOUTH .50
WEST .50
FLOOR .20
CEILING .50

Cosentini Associates

LUMEN MICRO VERSION 6.0

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DESIGN FILE: PA1.DES

AVERAGE ROOM SURFACE EXITANCES (lumens/ft²)

SURFACE	AVERAGE EXITANCE
NORTH	1.60
EAST	1.55
SOUTH	2.80
WEST	2.26
FLOOR	1.26
CEILING	1.37

Cosentini Associates

LUMEN MICRO VERSION 6.0

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DESIGN FILE: PAL.DES

ILLUMINANCE (footcandles)

WORKING PLANE HEIGHT: .00

AVERAGE: 6.20 MINIMUM: 1.30 MAXIMUM: 22.8 MEAN DEVIATION: 4.37

ABS. Y ABSOLUTE X-COORDINATE(S)
COORD.

.30 .90 1.50 2.10 2.70 3.30 3.90 4.50 5.10 5.70 6.30 6.90 7.50 8.10 8.70 9.30 9.90 10.50 11.10 11.70

46.80 * 4.43 4.65 4.76 4.84 4.94 4.83 4.78 4.64 4.48 4.31 4.12 3.92 3.71 3.54 3.33 3.21 3.00 2.85 2.73 2.57

44.40 * 6.43 6.76 6.95 7.04 7.10 6.97 6.83 6.54 6.24 5.92 5.57 5.39 4.84 4.56 4.21 3.97 3.69 3.48 3.29 3.05

42.00 * 8.66 9.15 9.41 9.52 9.56 9.14 9.07 8.59 8.09 7.56 7.00 6.43 5.88 5.45 4.97 4.63 4.27 3.99 3.72 3.45

39.60 * 9.39 9.94 10.2 10.4 10.4 10.1 9.82 9.27 8.69 8.09 7.47 6.83 6.21 5.74 5.21 4.04 4.45 4.14 3.88 3.55

37.20 * 7.94 8.37 8.60 8.70 8.75 8.55 8.33 7.92 7.47 7.02 6.53 6.01 5.53 5.16 4.72 4.42 4.08 3.92 3.60 3.31

34.80 * 5.59 5.87 5.98 6.04 6.11 6.00 5.92 5.67 5.44 5.21 4.93 4.63 4.35 4.14 3.85 3.65 3.42 3.26 3.12 2.9

32.40 * 3.66 3.82 3.88 3.91 3.96 3.94 3.93 3.81 3.70 3.62 3.49 3.33 3.19 3.11 2.95 2.85 2.70 2.62 2.53 2.37

30.00 * 2.47 2.57 2.59 2.60 2.66 2.64 2.67 2.60 2.56 2.55 2.49 2.41 2.35 2.34 2.25 2.21 2.12 2.09 2.05 1.94

27.60 * 1.87 1.90 1.90 1.89 1.94 1.94 1.98 1.93 1.92 1.94 1.92 1.87 1.85 1.86 1.81 1.80 1.74 1.74 1.74 1.72

25.20 * 1.45 1.54 1.56 1.64 1.59 1.59 1.63 1.60 1.60 1.63 1.62 1.59 1.56 1.61 1.57 1.56 1.51 1.52 1.51 1.46

22.80 * 1.32 1.37 1.38 1.37 1.41 1.42 1.45 1.42 1.43 1.46 1.46 1.43 1.42 1.45 1.42 1.42 1.37 1.39 1.38 1.34

20.40 * 1.31 1.32 1.32 1.30 1.34 1.34 1.38 1.36 1.35 1.39 1.39 1.35 1.35 1.38 1.35 1.35 1.32 1.33 1.34 1.34

18.00 * 1.31 1.27 1.38 1.37 1.42 1.43 1.47 1.44 1.45 1.48 1.48 1.45 1.45 1.48 1.44 1.43 1.38 1.39 1.39 1.33

15.60 * 1.73 1.83 1.86 1.88 1.95 1.97 2.04 2.02 2.04 2.08 2.08 2.04 2.03 2.04 1.99 1.96 1.89 1.87 1.84 1.74

13.20 * 2.58 3.14 3.22 3.10 3.46 3.56 3.71 3.76 3.82 3.89 3.89 3.83 3.77 3.72 3.88 3.44 3.32 3.23 3.16 2.96

10.80 * 5.54 5.88 6.13 6.28 6.70 6.92 7.14 7.56 7.80 7.95 7.95 7.81 7.59 7.36 7.01 6.73 6.41 6.17 5.92 5.57

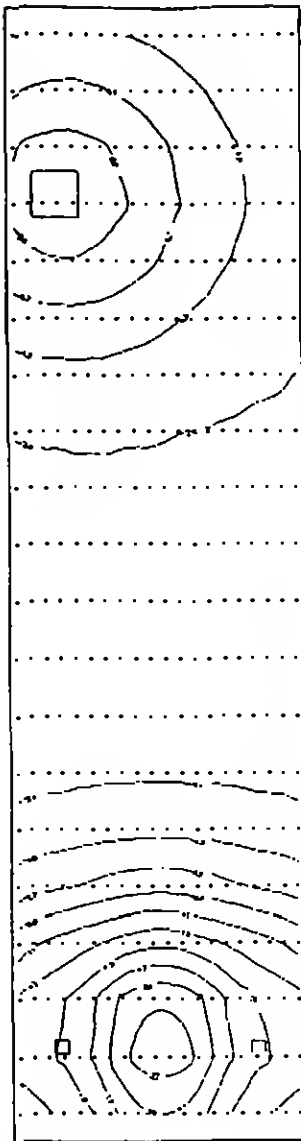
8.40 * 9.97 10.7 11.2 11.7 12.3 12.5 13.4 13.9 14.3 14.6 14.6 14.4 13.9 12.4 12.8 12.4 11.6 11.3 10.9 10.3

6.00 * 13.5 14.0 14.5 15.1 16.0 17.1 18.6 20.0 21.1 21.4 21.4 21.1 20.1 18.7 17.2 16.1 15.3 14.7 14.2 13.6

3.60 * 14.0 14.5 15.0 15.6 16.5 17.7 19.5 21.3 22.5 22.8 22.8 22.5 21.3 19.6 17.9 16.7 15.6 15.3 14.8 14.2

1.20 * 12.0 12.5 13.0 13.6 14.5 15.4 16.7 18.1 19.1 19.6 19.6 19.1 18.1 16.8 15.5 14.6 13.8 13.2 12.7 12.1

48.0



0.0

0.0 12.0

Surface: Grid 1

Design File: PA1

Units: footcandles

Scale: 1 foot = 1 foot

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

MEMORANDUM

To: Mr. Lou Menno, General Manager, World Trade Tenant Services
From: C. John Lin, P.E.
Date: May 11, 1998
Subject: **WTC - ALTERATION APPLICATION W-981121 - PANYNJ - 1 WTC, 92ND FLOOR - CORRIDOR AND LOBBY UPGRADE**

Reference: Review Request dated 4/27/98

Copy To: A. Fadavi T. O'Connor Job Folder
 G. Gaeta J. Napolitano Chrono Folder

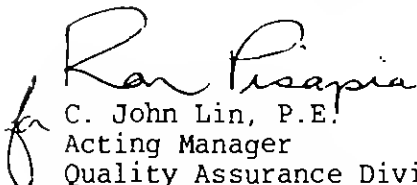
A review of the material submitted with the referenced request has been made.

It is recommended that **approval** to proceed with construction be given subject to the **submission** of the items listed below being **revised** in accordance with the **five (5) requirements** listed on the attached rider.

Drawings:

Specifications: Calculations:

- REMARKS: 1) Copies of Figure 10-3 and Drawing SP-9 referred to in Comment 2(b)(i) and Comment 4, respectively, will be sent with the signed copy of this memorandum.
- 2) See the attachment for a revised list of drawings recommended for approval.
- 3) This memorandum was transmitted to the Facility via OA on May 11, 1998.


C. John Lin, P.E.
Acting Manager
Quality Assurance Division

I.D.: W98-1121-002
TSM/al
att.

Reviewers:

T. Santa Maria, Electrical and Coordinator; Z.A. Zwierz, Mechanical; R. Lee, Structural; D. Luey, Fire Protection.

RIDER

ALTERATION APPLICATION W-981121

GENERAL

1. All design documents such as drawings, computations, and specifications shall be sealed and signed by the Architect or Engineer of Record licensed to practice in the State of New York.

ELECTRICAL

2. Drawing E192C. The response to Comment 1 of the previous Rider is noted. Two (2) printouts of iso footcandle curves, Design File PA1 (EXHIBIT 1) and Design File PA2 (EXHIBIT 2) representing the Elevator Lobby and the Corridor, respectively, were submitted. Also submitted is a printout, Design File PA2.des (herein designated as EXHIBIT 3) showing levels of illumination along the Corridor during normal conditions:
 - a) EXHIBIT 3 shows an average illumination of 12.9 fc and a minimum of 2.07 fc but EXHIBIT 1 and EXHIBIT 2 show that the levels of illumination drops to zero (no levels of illumination are shown) between the emergency fixtures. Please clarify, and submit printout of levels of illumination similar to EXHIBIT 3, but under emergency condition with the average and minimum levels of illumination indicated.
 - b) The levels of illumination submitted could not be verified since the following were not submitted, as requested in the previous Rider:
 - i) Submit the photometric data for each type of emergency fixtures used, including a typical candlepower distribution curve for each. See Figure 10-3.
 - ii) Submit information and/or data used in calculating/ verifying the levels of illumination.
 - c) On Drawing (E192C), show the specific type of fixtures to be used. The emergency fixtures are designated as B/B1 and A/A1. Please be specific.
 - d) EXHIBIT 1 and EXHIBIT 2. Please indicate on the printout the following: fixture type, manufacturer, lamp designation, volt and volt-ampere (e.g., type A1, Neoray Fenestra 202/bx, F403bxsp35GE, 120V, 80 VA).
 - e) EXHIBIT 1 and EXHIBIT 2. Please indicate on the printout all the computer input data used in calculating the levels of illumination.

W-981121 (cont'd)

MECHANICAL

3. Drawing M-1.01, Details of Methods of Hanging Ductwork. In this detail, specify the maximum distances between duct hangers as well as the minimum sizes of duct hanger straps in conformance with NYC Building Code RS 13-1, Section 2-1.1.2.3(a).(3), (4), and (5). Note that Section 2-1.1.2.3(a).(4) contains typographical error indicating the minimum hanger sizes as 1 inch by 1/18 inch, instead of 1 inch by 1/8 inch. (Repeat comment)

FIRE PROTECTION

4. Drawing SP-102. Show all new and existing sprinkler piping and sizes in the area of work. See attached Drawing SP-9 (2 sheets). (Modified repeat comment)
5. Technical Specifications Division 15 (Sections 15300 and 15500) are missing. Please submit for review. (Modified repeat comment)

051198

ATTACHMENT

ALTERATION APPLICATION W-981121

Subject to compliance with the requirements listed in this memorandum's rider, the following is a revised list of drawings recommended for approval:

Drawing

T-1	dated	3/16/98
T-2	dated	3/16/98
A-1	dated	3/16/98
A-2	dated	3/16/98
A-3	dated	3/16/98
E192K	dated	3/16/98
E192C	dated	3/16/98
M-1.0	dated	3/16/98
M-1.01	dated	3/16/98
SP-102	dated	2/13/98

051198

The Port Authority of NY & NJ

To: T. Santa Maria
From: Danny Luey
Date: April 30, 1998

Subject: Tenant Alterations Review Request
Application No. W98-1121 #2
Fire Protection Comments

1. General: The electrical, mechanical and sprinkler design documents, such as drawings, computations, and specifications, shall be sealed and signed by the architect of record licensed to practice in New York State or acknowledged consultant. (modified repeat comment)
2. Drawing No. SP-102: Show all new and existing sprinkler piping and sizes in area of work. See attached drawing. (modified repeat comment)
3. Technical Specification division 15 (sections 15300 and 15500) are missing. Submit for review. (modified repeat comment)

The Port Authority of NY & NJ

To: S. Sharma
From: Danny Luey
Date: February 25, 1998

Subject: Tenant Alterations Review Request
Application No. W98-1121 #1
Fire Protection Comments

1. General: The design documents, such as drawings, computations, and specifications, shall be sealed and signed by the architect of record licensed to practice in New York State or acknowledged consultant.
2. Drawing No. SP-102:
 - a. Show all new and existing sprinkler piping and sizes in area of work.
 - b. Add "Concealed sprinkler heads shall be chrome plated, 1/2" orifice with a 165°F temperature rating.
3. Technical Specification division 15 (sections 15300, 15400, and 15600) are missing. Submit for review.

Reviewer: Z. Andrew Zwierz
Coordinator: T. Santa Maria
Date: 05/04/98

PANYNJ – 1 WTC – 92ND Floor
Corridor and Lobby Upgrade - WTC
W2-405-083-200.444

EW98-1121-001

MECHANICAL

- _. Drawing M-1.01, Detail of Methods of Hanging Ductwork. In this detail specify the maximum distances between duct hangers as well as the minimum sizes of duct hanger straps in conformance with NYC Building Code RS 13-1, Sections 2-1.1.2.3.(a).(3), (4), and (5). Note, that Section 2-1.1.2.3.(a).(4) contains typographical error indicating the minimum hanger size as 1 in. by 1/18th in. instead of 1 in. by 1/8th in. (Repeat comment)

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
ENGINEERING DEPARTMENT - DESIGN DIVISION TAA REVIEW REQUEST

To: D. LUEY (Reviewer) Location: 745
From: QAD DESIGN STANDARDS Date: 4/28/98
TAA # W98-1121-002 Facility: 1 WTC/92
(Submission #)
Tenant: WTD Rec'd. Date: 4/28/98
Description of Work: CORRIDOR UPGRADE
Charge Code: W2-X-Y-200.444

Review Disciplines

- ☐ Architectural
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☒ Fire Protection/ Sprinklers/Etc.
- ☐ Electrical/Metering
- ☐ Utility > 600 V/ 5 KV
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental/Asbestos Abatem't.
- ☐ Fueling
- ☐ Radio Frequency Coordination
- ☐ Corrosion Protection
- ☐ Elevator/Escalator
- ☐ Traffic
- ☐ Other(specify) _____

Attachments

- ☐ Document List
- ☒ Contract Drawings
- ☐ Contract Specifications
- ☒ Tenant Response
- ☐ Calculations
- ☐ Catalog Cuts
- ☐ Reports
- ☐ Certifications
- ☐ Previous Rider
- ☐ Other (specify) _____

Special Instructions

SPECS NOT SUBMITTED

Reviewer Information

Name Danny Luey
Date started April 29, 1998
Date completed April 30, 1998
Review time(days) _____
New comments _____
Repeat comments 3

DUE DATE: 5/14/98

Please notify the COORDINATOR if you cannot
complete the review by the due date.

Please review the attached submittal; FAX and send your written comments to the
following COORDINATOR:

Name: T. SANTA MARIA Location: 51N
Phone #: (212) 435-81009 FAX #: (212) 435-2069*

* If responding by fax, please advise coordinator in advance at telephone
number indicated. (Note new fax number).

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
ENGINEERING DEPARTMENT - DESIGN DIVISION TAA REVIEW REQUEST

To: D. LUEY (Reviewer) Location: 744
From: QAD DESIGN STANDARDS Date: 4/28/98
TAA # W98-1121-002 Facility: 1 WTL/92
(Submission #)
Tenant: WTD Rec'd. Date: 4/28/98
Description of Work: CORRIDOR UPGRADE
Charge Code: W2-X-Y-200.444

Review Disciplines

- ☐ Architectural
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☒ Fire Protection/ Sprinklers/Etc.
- ☐ Electrical/Metering
- ☒ Utility > 600 V/ 5 KV
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental/Asbestos Abatem't.
- ☐ Fueling
- ☐ Radio Frequency Coordination
- ☐ Corrosion Protection
- ☐ Elevator/Escalator
- ☐ Traffic
- ☐ Other(specify) _____

Attachments

- ☐ Document List
- ☒ Contract Drawings
- ☒ Contract Specifications
- ☒ Tenant Response
- ☐ Calculations
- ☐ Catalog Cuts
- ☐ Reports
- ☐ Certifications
- ☐ Previous Rider
- ☐ Other (specify) _____

Special Instructions

SPECS NOT SUBMITTED

Reviewer Information

Name _____
Date started _____
Date completed _____
Review time(days) _____
New comments _____
Repeal comments _____

DUE DATE: 5/14/98

Please notify the COORDINATOR if you cannot
complete the review by the due date.

Please review the attached submittal; FAX and send your written comments to the
following COORDINATOR:

Name: T. SANTA MARIA Location: 51N
Phone #: (212) 435-81009 FAX #: (212) 435-2069*

* If responding by fax, please advise coordinator in advance at telephone
number indicated. (Note new fax number).

**THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
TENANT ALTERATION APPLICATION REVIEW REQUEST**

PA 1 5/11

DISTRIBUTION		
No	To	Facility
1	QAD	51 N
1	D. Warren	PATC ZIP43
1	S.P. Chiao	88-S
1	G. Daly	88-S
2	S. Batra	2WTC 37FL
1	C. Bonacci	2WTC 35FL

Facility One FLR 92nd TAA No. 981-121 Date 4/27/98

Application / Tenant Corridor Upgrade

Consultant Swanick Hayler

Estimated Cost \$150,000 Submittal No. Three

Description of Work Corridor Upgrade

Please review the attached (revised) application and send comments to:

Name: Jennifer Richardson

Location: 1 WTC - 88 - South Phone: 435-2014

5/14/98
DUE DATE

DESIGN DISCIPLINES

- ☐ Architectural
- ☐ Egress Analysis
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☐ Sprinkler
- ☐ Electrical
- ☐ Utility > 600 V
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental
- ☐ Fueling
- ☐ Radio Freq. Coord.
- ☐ Corrosion Protection
- ☐ Elevator / Escalator
- ☐ Other _____

ATTACHMENTS

- ☒ Document List
- ☒ Contract Drawings
- ☐ Contract Specifications
- ☒ Tenant Response
- ☐ Computations
- ☐ Reports
- ☐ Catalog Cuts
- ☐ Other _____

DESCRIPTION

*REV'D 4/23
NO TO 50% REV
10 DAYS
AS PER
R.P.*

Special Instructions

Please Review in 5 days

Copy To: G. Gaeta, J. Napolitano, E. Monteverde, N. Seliga

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
DESIGN STANDARDS (Proj. Mgr.)

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
QUALITY ASSURANCE DIV.
ENGINEERING DEPT.

APR 28 1998
W98-1121
RECEIVED

NOTED: REFERRED TO: Engineering/TAA/review - revised 3/3/98

OFFICE COPY

APR 28 1998
W98-1121
RECEIVED
ALTERATIONS APPLICATION
TENANT CONSTRUCTION

INDEX OF DRAWINGS

3/16 T-1 TITLE SHEET
T-2 LIST OF ABBREVIATIONS, INDEX OF DRAWINGS
DWG. CONVENTIONS, GENERAL NOTES

ARCHITECTURAL

A-1 DEMOLITION PLAN, LEGEND & NOTES
A-2 CONSTRUCTION PLAN, REFLECTED CEILING PLAN,
LEGENDS & NOTES
A-3 ELEVATIONS, PARTITION TYPES, MISC. DETAILS
& SCHEDULES

ELECTRICAL

E-192K 92ND FLOOR KEY PLAN / SYMBOL LIST
E-192C CONSTRUCTION / DEMOLITION PLAN

MECHANICAL

M-100 92ND FLOOR DEMOLITION PLAN
M-101 92ND FLOOR NEW HVAC DUCTWORK PLAN

SPRINKLER

2/13 SP-102 92ND FLOOR SPRINKLER PLAN

THE PORTLAND
ENGINEERING DESIGN
DESIGN

APR 28 1986
WFS-1121 (2)

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ALTERATIONS /
TENANT CONSTRUCTION

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DIVISION 12 (Not Used)

DIVISION 13 (Not Used)

DIVISION 14 (Not Used)

DIVISION 15

15300 - Sprinklers

15500 - HVAC

DIVISION 16

16000 - Electrical

X

END OF TABLE OF CONTENTS

RIDERALTERATION APPLICATION W-981121ELECTRICAL

1. Drawing E192C. Five (5) 2'x2' emergency lighting fixtures are shown in the corridors, four (4) compact fluorescent downlights at the intersection of the corridors, and another four (4) at the Elevator Lobby. Please verify that in the event of failure of normal lighting, these arrangements of emergency lighting fixtures will provide at least 2 foot-candles of illumination measured at the floor level along the full length of the corridors at Elevator Lobby, at changes in direction and at the intersection of corridors. If calculations indicate inadequate levels of illumination at certain part(s) of the corridors and the Elevator Lobby, the design shall be revised accordingly. Please submit the photometric data for all emergency lighting fixtures, and other related information that were used in calculating/verifying the levels of illumination. Also, please submit a typical calculation of the levels of illumination. See NYC Building Code Section 27-381.

MECHANICAL

2. Drawing M-1.01. Where the existing corridor supply air ducts penetrate shaft walls indicate existing or, if required, provide new fire dampers and access doors, in conformance with NYC Building Code RS 13-1, Section 3-3.2.1.
3. Drawing M-1.01. Provide installation detail of duct hanging methods to be used in this design. In this detail specify the maximum distances between duct hangers as well as the minimum sizes of duct hanger straps in conformance with NYC Building Code RS 13-1, Sections 2.1.1.2.3.(a).(3), (4), and (5). Note, that Section 2-1.1.2.3.(a).(4) contains typographical error indicating the minimum hanger size as 1-inch by 1/18th inch instead of 1 inch by 1/8th inch.

STRUCTURAL

4. Drawing A-1. Please add a note that demolition work shall be in compliance with Article 6, Subchapter 19 of the NYC Building Code "Demolition Operations". **REVISED ACCORDINGLY.**
5. Drawing A-3, New Suspended Ceiling System. Details S3 through S6 are noted. Please add notes for ceiling work in the trussed areas of the WTC, as per PANYNJ Tenant Construction Review Manual, Attachment S2. These notes shall govern requirements of all material and attachments of the new ceiling system. **REVISED ACCORDINGLY.**

ENGINEER

DESIGN

APR 26 1998

W98-1121 (2)

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ALTERATIONS APPLICATION
TENANT CONSTRUCTION REVIEW

OFFICE COPY

W-981121 (cont'd)

FIRE PROTECTION

6. Drawing SP-102:

- a) Show all new and existing sprinkler piping and sizes in the area of work.
- b) Add the following note: "Concealed sprinkler heads shall be chrome plated, 1/2" orifice with 165°F temperature rating."

7. Technical Specification Division 15 (Sections 15300, 15400, and ~~15500~~) are missing. Submit for review.

section 15300 - sprinklers is included.

" 15400 - Plumbing - N.I.C.

" 15600 should be 15500 - HVAC

there is no 15600 on this project

note: Table of Contents of Technical specifications to be revised.

030398

ATTACHMENT

ALTERATION APPLICATION W-981121

Subject to compliance with the requirements listed in this memorandum's rider, the following is a list of drawings recommended for approval:

Drawing

T-1	dated	02/13/98
T-2	dated	02/13/98
A-1	dated	02/13/98
A-2	dated	02/13/98
A-3	dated	02/13/98
E192K	dated	02/13/98
E192C	dated	02/13/98
M-1.00	dated	02/13/98
M-101	dated	02/13/98
M-102	dated	02/13/98

030398

OFFICE MEMORANDUM

TO: Ms. Nancy Walks

SUBJECT: WTC Upgrade

FROM: Mr. Jason Daly 

JOB NO: 1471-2

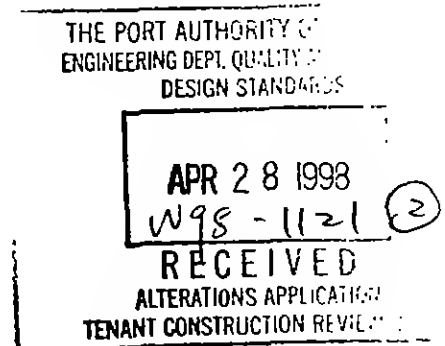
CC: Mr. John Jappan/SHC
Mr. Pete Costa/CA
Mr. Phil Cebulski/CA

DATE: March 13, 1998

Enclosed please find our response to the Port Authority's comments regarding the corridor upgrade project with respect to the second floor MEP design documents.

Also, enclosed please find MEP design documents issued for bid March 16, 1998.

X:\WP\MH\ES\1471-2 98\JDK0313.M01



OFFICE COPY

MECHANICAL

1. Drawing M1.01 - Will comply
2. Drawing M1.01 - Will comply

WORLD TRADE CENTER
92ND FLOOR - SPRINKLER PART PLAN

DWG. SP-102

1. We need as-built dwg. to show all existing piping in scope of work.
2. See sprinkler specification.

ELECTRICAL

1. Attached please find our "worse case" lighting calculations, performed in locations that were coordinated with Mr. Santomaria of the Port Authority, which shows the current arrangement of emergency lighting complies with New York City Building Code Section 27-381.

Please note that Mr. Santomaria agrees with the current New York City Building Department interpretation of that section of the code, issued January 20, 1987, (also attached) which states emergency lighting must provide at least two (2) foot candles **average** minimum illumination measured at 18 inches above the floor level and no less than ½ a foot candle in any given location. The attached calculations will serve as typical for all of the upgrade work to follow.

MAR-04-1998 11:14

RIDERALTERATION APPLICATION W-981121ELECTRICAL

- Pamela
Donne and
92 FLR*
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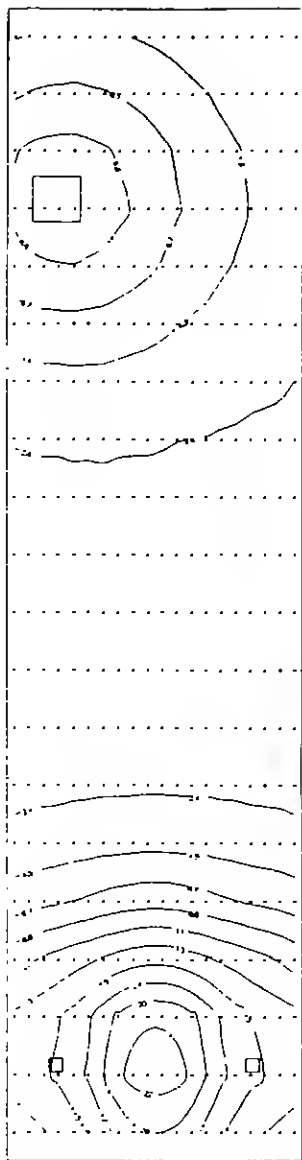
MECHANICAL

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48.0



0.0

0.0 12.0

Analysis: Horizontal Illuminance Scale: 0.5 = 10

Surface: Grid 1

Design File: PA1

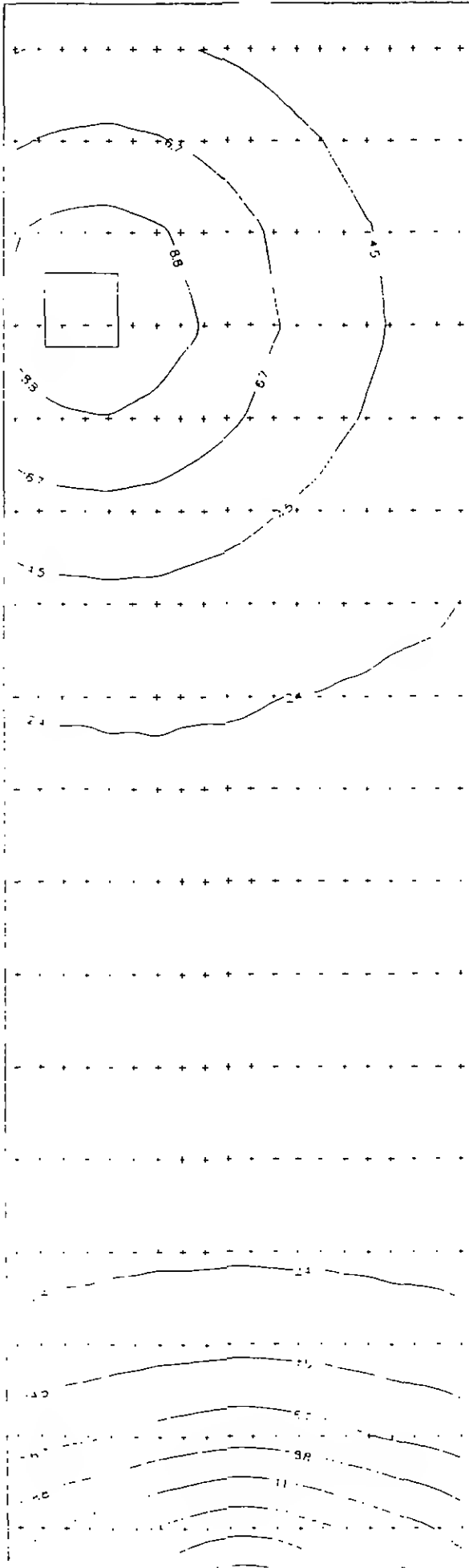
Units: footcandles

Auto File Name: 01_Corridor_11_12_13_14_15_16_17_18_19_20_21_22_23_24_25_26_27_28_29_30_31_32_33_34_35_36_37_38_39_40_41_42_43_44_45_46_47_48_49_50_51_52_53_54_55_56_57_58_59_60_61_62_63_64_65_66_67_68_69_70_71_72_73_74_75_76_77_78_79_80_81_82_83_84_85_86_87_88_89_90_91_92_93_94_95_96_97_98_99_100_101_102_103_104_105_106_107_108_109_110_111_112_113_114_115_116_117_118_119_120_121_122_123_124_125_126_127_128_129_130_131_132_133_134_135_136_137_138_139_140_141_142_143_144_145_146_147_148_149_150_151_152_153_154_155_156_157_158_159_160_161_162_163_164_165_166_167_168_169_170_171_172_173_174_175_176_177_178_179_180_181_182_183_184_185_186_187_188_189_190_191_192_193_194_195_196_197_198_199_200_201_202_203_204_205_206_207_208_209_210_211_212_213_214_215_216_217_218_219_220_221_222_223_224_225_226_227_228_229_230_231_232_233_234_235_236_237_238_239_240_241_242_243_244_245_246_247_248_249_250_251_252_253_254_255_256_257_258_259_260_261_262_263_264_265_266_267_268_269_270_271_272_273_274_275_276_277_278_279_280_281_282_283_284_285_286_287_288_289_290_291_292_293_294_295_296_297_298_299_300_301_302_303_304_305_306_307_308_309_310_311_312_313_314_315_316_317_318_319_320_321_322_323_324_325_326_327_328_329_330_331_332_333_334_335_336_337_338_339_340_341_342_343_344_345_346_347_348_349_350_351_352_353_354_355_356_357_358_359_360_361_362_363_364_365_366_367_368_369_370_371_372_373_374_375_376_377_378_379_380_381_382_383_384_385_386_387_388_389_390_391_392_393_394_395_396_397_398_399_400_401_402_403_404_405_406_407_408_409_410_411_412_413_414_415_416_417_418_419_420_421_422_423_424_425_426_427_428_429_430_431_432_433_434_435_436_437_438_439_440_441_442_443_444_445_446_447_448_449_450_451_452_453_454_455_456_457_458_459_460_461_462_463_464_465_466_467_468_469_470_471_472_473_474_475_476_477_478_479_480_481_482_483_484_485_486_487_488_489_490_491_492_493_494_495_496_497_498_499_500_501_502_503_504_505_506_507_508_509_510_511_512_513_514_515_516_517_518_519_520_521_522_523_524_525_526_527_528_529_530_531_532_533_534_535_536_537_538_539_540_541_542_543_544_545_546_547_548_549_550_551_552_553_554_555_556_557_558_559_560_561_562_563_564_565_566_567_568_569_570_571_572_573_574_575_576_577_578_579_580_581_582_583_584_585_586_587_588_589_590_591_592_593_594_595_596_597_598_599_600_601_602_603_604_605_606_607_608_609_610_611_612_613_614_615_616_617_618_619_620_621_622_623_624_625_626_627_628_629_630_631_632_633_634_635_636_637_638_639_640_641_642_643_644_645_646_647_648_649_650_651_652_653_654_655_656_657_658_659_660_661_662_663_664_665_666_667_668_669_670_671_672_673_674_675_676_677_678_679_680_681_682_683_684_685_686_687_688_689_690_691_692_693_694_695_696_697_698_699_700_701_702_703_704_705_706_707_708_709_710_711_712_713_714_715_716_717_718_719_720_721_722_723_724_725_726_727_728_729_730_731_732_733_734_735_736_737_738_739_740_741_742_743_744_745_746_747_748_749_750_751_752_753_754_755_756_757_758_759_760_761_762_763_764_765_766_767_768_769_770_771_772_773_774_775_776_777_778_779_780_781_782_783_784_785_786_787_788_789_790_791_792_793_794_795_796_797_798_799_800_801_802_803_804_805_806_807_808_809_810_811_812_813_814_815_816_817_818_819_820_821_822_823_824_825_826_827_828_829_830_831_832_833_834_835_836_837_838_839_840_841_842_843_844_845_846_847_848_849_850_851_852_853_854_855_856_857_858_859_860_861_862_863_864_865_866_867_868_869_870_871_872_873_874_875_876_877_878_879_880_881_882_883_884_885_886_887_888_889_890_891_892_893_894_895_896_897_898_899_900_901_902_903_904_905_906_907_908_909_910_911_912_913_914_915_916_917_918_919_920_921_922_923_924_925_926_927_928_929_930_931_932_933_934_935_936_937_938_939_940_941_942_943_944_945_946_947_948_949_950_951_952_953_954_955_956_957_958_959_960_961_962_963_964_965_966_967_968_969_970_971_972_973_974_975_976_977_978_979_980_981_982_983_984_985_986_987_988_989_990_991_992_993_994_995_996_997_998_999_1000

ELEVATOR LOBBY

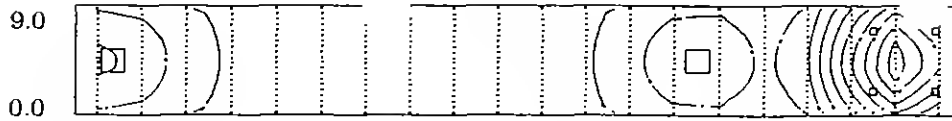
FEEL CONDITION

48.0



ELEVATION LOBBY

X



0.0

70.0

Analysis: Horizontal Illuminance

Scale: 0.065 = 1.00

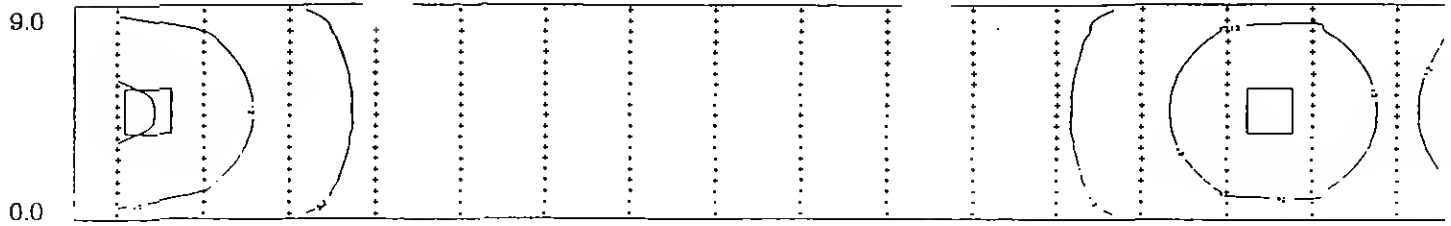
Surface: Grid 1

Design File: PA2

Units: footcandles

Lumen Micro Version 6.0 Copyright (c) Lighting Technologies Inc. 1993

CORRIDOR



0.0

Analysis: Horizontal Illuminance

Scale: 0.125 = 1.00

Surface: Grid 1

Design File: PA2

Units: footcandles

Lumen Micro Version 6.0 Copyright (c) Lighting Technologies Inc. 1993

CORRIDOR

CORRIDOR

ILLUMINANCE (footcandles)

WORKING PLANE HEIGHT: 2.50

AVERAGE: 12.9 MINIMUM: 2.07 MAXIMUM: 65.0 MEAN DEVIATION: 10.8

ABS. Y ABSOLUTE X-COORDINATE(S)
COORD.

1.75 5.25 8.75 12.25 15.75 19.25 22.75 26.25 29.75 33.25 36.75 40.25 43.75 47.25 50.75 54.25 57.75 61.25 64.75 68.25

8.77 * 11.0 9.42 5.59 3.49 2.61 2.28 2.12 2.07 2.23 2.30 2.70 3.81 5.88 9.57 9.85 6.80 12.0 29.8 45.9 36.1
8.32 * 12.1 10.7 6.23 3.82 2.86 2.52 2.33 2.28 2.44 2.51 2.95 4.17 6.60 10.9 11.3 7.57 13.1 32.8 50.4 38.1
7.87 * 13.1 11.5 6.49 3.85 2.84 2.49 2.30 2.24 2.34 2.47 2.92 4.13 6.91 11.9 12.1 7.87 13.6 34.4 52.9 39.7
7.42 * 14.3 12.5 6.82 3.99 2.91 2.54 2.35 2.29 2.38 2.53 3.00 4.24 7.30 12.9 13.1 8.29 14.3 35.9 55.4 41.7
6.97 * 15.4 13.4 7.06 4.02 2.90 2.51 2.33 2.27 2.34 2.51 2.99 4.26 7.58 13.9 14.1 8.58 14.9 37.2 57.6 43.4
6.52 * 16.4 14.3 7.31 4.09 2.93 2.53 2.35 2.29 2.35 2.52 3.01 4.33 7.88 14.9 15.0 8.89 15.5 38.5 59.9 45.3
6.07 * 17.5 15.1 7.55 4.17 2.98 2.57 2.39 2.32 2.39 2.56 3.06 4.42 8.16 15.8 15.9 9.20 16.1 39.8 61.9 47.1
5.62 * 18.1 15.7 7.69 4.19 2.98 2.56 2.38 2.32 2.37 2.56 3.07 4.45 8.34 16.5 16.6 9.41 16.4 40.7 63.2 48.4
5.17 * 18.7 16.2 7.84 4.26 3.02 2.59 2.41 2.35 2.41 2.60 3.11 4.51 8.51 17.0 17.1 9.60 16.6 41.4 64.2 49.7
4.72 * 18.9 16.3 7.88 4.26 3.01 2.58 2.40 2.33 2.39 2.58 3.10 4.51 8.56 17.2 17.3 9.66 16.7 41.8 64.7 49.9
4.27 * 18.9 16.3 7.88 4.26 3.01 2.58 2.40 2.33 2.39 2.58 3.10 4.51 8.56 17.2 17.3 9.67 16.6 41.9 65.0 49.3
3.82 * 18.8 16.2 7.88 4.29 3.05 2.62 2.44 2.37 2.43 2.62 3.14 4.54 8.55 17.0 17.2 9.65 16.6 41.8 65.0 49.4
3.37 * 18.1 15.7 7.69 4.20 2.99 2.56 2.38 2.32 2.38 2.56 3.08 4.45 8.34 16.4 16.6 9.42 16.2 41.1 63.9 47.7
2.92 * 17.4 15.1 7.55 4.18 2.99 2.58 2.40 2.33 2.40 2.57 3.07 4.43 8.16 15.7 15.9 9.20 15.7 40.0 62.1 45.5
2.47 * 16.4 14.2 7.31 4.11 2.95 2.54 2.36 2.30 2.36 2.54 3.03 4.34 7.87 14.8 15.0 8.98 15.1 38.4 59.6 43.5
2.02 * 15.3 13.3 7.06 4.04 2.92 2.53 2.35 2.29 2.36 2.52 3.00 4.28 7.58 13.9 14.0 8.55 14.4 36.7 56.9 41.5
1.57 * 14.2 12.5 6.83 4.01 2.93 2.56 2.37 2.31 2.40 2.55 3.02 4.26 7.29 12.9 13.1 8.24 13.9 35.0 54.2 39.5
1.12 * 13.0 11.5 6.50 3.88 2.87 2.51 2.32 2.27 2.37 2.49 2.95 4.15 6.91 11.8 12.0 7.92 13.1 33.0 51.2 37.2
0.67 * 12.0 10.5 6.24 3.86 2.89 2.56 2.36 2.31 2.48 2.54 2.98 4.11 6.60 10.9 11.1 7.50 12.5 30.9 47.9 34.9
0.22 * 10.9 9.35 5.60 3.52 2.64 2.31 2.15 2.10 2.26 2.33 2.73 3.84 5.89 9.50 9.75 6.73 11.3 27.9 43.2 32.3



DEPARTMENT OF BUILDINGS

EXECUTIVE OFFICES
60 HUDSON STREET, NEW YORK, NY 10013

CHARLES M. SMITH, Jr., R.A., Commissioner
312-8100

January 20, 1987

TO: BOROUGH SUPERINTENDENTS

FROM: Charles M. Smith Jr., R.A.,
Commissioner

SUBJECT: "EMERGENCY LIGHTING IN EXITS AND ACCESS FACILITIES"

(Supersedes memorandum of February 19, 1986)

Professional Societies and Industry have brought to our attention the difficulty in measuring the required illumination at the floor level because of incapability of instrumentation, and diversity of reflecting surfaces.

Therefore, the Departmental Memorandum dated February 19, 1986 is superseded as follows:

Illumination of at least two(2) foot candles measured at the floor level shall be maintained continuously in exits during occupancy as required by Section 27-381(a) [C26-605.1(a)]. Illumination in access facilities to such exits shall be not less than two(2) foot candles, average measured at 18 inches above the floor level which shall be maintained continuously during occupancy. However, the illumination shall not be less than that recommended in the I.E.S. Lighting Handbook 1981 Application Volume (Pages 2-45 and 2-46). Additionally the required illumination shall be remeasured if the reflective surfaces are changed.

A total of more than four(4) lights are required to be connected to an emergency power source or to storage battery equipment by Section 27-382 [C26-605.2(a)].

The following definitions shall apply:

The term "access facilities" shall mean a "corridor" or "public hallway" in multi-tenant floors; and in single tenant floors it shall mean the enclosed or unenclosed passage connecting the required floor exits and any passenger elevator serving floor to two required floor exits.

2/6/87

VLW

Please copy, dated
& circulate to all DDE
member firms
J. Jakubitz

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

MEMORANDUM

To: Mr. Lou Menno, General Manager, World Trade Tenant Services
From: C. John Lin, P.E.
Date: March 3, 1998
Subject: **WTC - ALTERATION APPLICATION W-981121 - PANYNJ - 1 WTC, 92ND FLOOR - CORRIDOR AND LOBBY UPGRADE**

Reference: Review Request dated 2/18/98


Copy To:	A. Fadavi	T. O'Connor	Job Folder
	G. Gaeta	J. Napolitano	Chrono Folder
	D. Luey		

A review of the material submitted with the referenced request has been made.

It is recommended that **approval** to proceed with construction be given subject to the **submission** of the items listed below being **revised** in accordance with the **seven (7) requirements** listed on the attached rider.

Drawings: Specifications:

- REMARKS: 1) See the attachment for a list of drawings recommended for approval.
- 2) This memorandum was transmitted to the Facility via OA on March 3, 1998.

for 
C. John Lin, P.E.
Acting Manager
Quality Assurance Division

I.D.: W98-1121-001
SS/al
att.

Reviewers:
S. Sharma, Coordinator and Structural; D. Remeta, Architectural;
T. Santa Maria, Electrical; Z.A. Zwierz, Mechanical; D. Luey, Fire Protection.

RIDER

ALTERATION APPLICATION W-981121

ELECTRICAL

1. Drawing E192C. Five (5) 2'x2' emergency lighting fixtures are shown in the corridors, four (4) compact fluorescent downlights at the intersection of the corridors, and another four (4) at the Elevator Lobby. Please verify that in the event of failure of normal lighting, these arrangements of emergency lighting fixtures will provide at least 2 foot-candles of illumination measured at the floor level along the full length of the corridors at Elevator Lobby, at changes in direction and at the intersection of corridors. If calculations indicate inadequate levels of illumination at certain part(s) of the corridors and the Elevator Lobby, the design shall be revised accordingly. Please submit the photometric data for all emergency lighting fixtures, and other related information that were used in calculating/verifying the levels of illumination. Also, please submit a typical calculation of the levels of illumination. See NYC Building Code Section 27-381.

MECHANICAL

2. Drawing M-1.01. Where the existing corridor supply air ducts penetrate shaft walls indicate existing or, if required, provide new fire dampers and access doors, in conformance with NYC Building Code RS 13-1, Section 3-3.2.1.
3. Drawing M-1.01. Provide installation detail of duct hanging methods to be used in this design. In this detail specify the maximum distances between duct hangers as well as the minimum sizes of duct hanger straps in conformance with NYC Building Code RS 13-1, Sections 2.1.1.2.3.(a).(3), (4), and (5). Note, that Section 2-1.1.2.3.(a).(4) contains typographical error indicating the minimum hanger size as 1-inch by 1/18th inch instead of 1 inch by 1/8th inch.

STRUCTURAL

4. Drawing A-1. Please add a note that demolition work shall be in compliance with Article 6, Subchapter 19 of the NYC Building Code "Demolition Operations".
5. Drawing A-3, New Suspended Ceiling System. Details S3 through S6 are noted. Please add notes for ceiling work in the trussed areas of the WTC, as per PANYNJ Tenant Construction Review Manual, Attachment S2. These notes shall govern requirements of all material and attachments of the new ceiling system.

W-981121 (cont'd)

FIRE PROTECTION

6. Drawing SP-102:

- a) Show all new and existing sprinkler piping and sizes in the area of work.
- b) Add the following note: "Concealed sprinkler heads shall be chrome plated, 1/2" orifice with 165°F temperature rating."

7. Technical Specification Division 15 (Sections 15300, 15400, and 15600) are missing. Submit for review.

030398

ATTACHMENT

ALTERATION APPLICATION W-981121

Subject to compliance with the requirements listed in this memorandum's rider, the following is a list of drawings recommended for approval:

Drawing

T-1	dated	02/13/98
T-2	dated	02/13/98
A-1	dated	02/13/98
A-2	dated	02/13/98
A-3	dated	02/13/98
E192K	dated	02/13/98
E192C	dated	02/13/98
M-1.00	dated	02/13/98
M-101	dated	02/13/98
M-102	dated	02/13/98

030398

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
ENGINEERING DEPARTMENT - DESIGN DIVISION TAA REVIEW REQUEST

To: D. LUBY (Reviewer) Location: 73 E
From: QAD DESIGN STANDARDS Date: 2, 20, 98
TAA # W98-1121-001 Facility: 1 WTC/92
(Submission #)
Tenant: WTD Rec'd. Date: 2, 18, 98
Description of Work: CORRIDOR UPGRADE
Charge Code: W2-X-X-2.00.444

Review Disciplines

- ☐ Architectural
- ☐ Structural
- ☐ HVAC
- ☐ Plumbing
- ☐ Fire Protection/ Sprinklers/Etc.
- ☐ Electrical/Metering
- ☐ Utility > 600 V/ 5 KV
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental/Asbestos Abatement
- ☐ Fueling
- ☐ Radio Frequency Coordination
- ☐ Corrosion Protection
- ☐ Elevator/Escalator
- ☐ Traffic
- ☐ Other(specify) _____

Attachments

- ☐ Document List
- ☐ Contract Drawings
- ☐ Contract Specifications
- ☐ Tenant Response
- ☐ Calculations
- ☐ Catalog Cuts
- ☐ Reports
- ☐ Certifications
- ☐ Previous Rider
- ☐ Other (specify) _____

Special Instructions

Reviewer Information

Name _____
Date started _____
Date completed _____
Review time(days) _____
New comments _____
Repeat comments _____

DUE DATE: 2, 26, 98

Please notify the COORDINATOR if you cannot
complete the review by the due date.

Please review the attached submittal; FAX and send your written comments to the
following COORDINATOR:

Name: S. SHARMA Location: 51N
Phone #: (212) 435- 8613 FAX #: (212) 435-8555 *

* IF RESPONDING BY FAX, PLEASE ADVISE COORDINATOR IN
ADVANCE AT TELEPHONE NUMBER INDICATED.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY
TENANT ALTERATION APPLICATION REVIEW REQUEST

DISTRIBUTION		
No.	To	Facility
④	Quality Assur.	51N
①	E. DALY	88S
①	S. P. Chiao	88S
①	J. Napolitano	88S
①	J. Castaldo	2 WTC 37
①	P. Taylor	2 WTC 37
①	D. Warren	PATC ZIP 43
1	C. SEMAK	2 WTC 35

Facility 1 WTC 92nd FL TAA No. 981121 Date 2/18/98
 Application / Tenant World Trade Center
 Consultant Swanke - Hayden
 Estimated Cost \$190,000 Submittal No. 01
 Description of Work
Corridor Upgrade

Please review the attached (revised) application and send comments to:

Name Sam Murray 3/14/98
 Location 1 WTC, 88S Phone No 435-8240 DUE DATE

DESIGN DISCIPLINES

- ☒ Architectural
- ☐ Egress Analysis
- ☐ Structural
- ☒ HVAC
- ☐ Plumbing
- ☒ Sprinklers
- ☒ Electrical
- ☐ Utility > 600 V
- ☐ Civil
- ☐ Geotechnical
- ☐ Environmental
- ☐ Fueling
- ☐ Radio Freq. Coord.
- ☐ Corrosion Protection
- ☐ Elevator / Escalator
- ☐ Other

ATTACHMENTS

- ☐ Document List
- ☐ Contract Drawings
- ☐ Contract Specifications
- ☐ Tenant Response
- ☐ Computations
- ☐ Reports
- ☐ Catalog Cuts
- ☐ Other

DESCRIPTION

THE PORT AUTHORITY OF NY & NJ
 QUALITY ASSURANCE DIV.
 ENGINEERING DEPT.
 FEB 18 1998
 RECEIVED
 NOTED:
 REFERRED TO:
 THE PORT AUTHORITY OF N.Y. & N.J.
 ENGINEERING DEPT. QUALITY ASSURANCE
 DESIGN STANDARDS

Special Instructions

FEB 18 1998
 W98-1121
 RECEIVED
 ALTERATIONS APPLICATION
 TENANT CONSTRUCTION REVIEW UNIT

①

Copy To: G. GAETA, E. Daly, T. Lynch
E. Monteverde, N. Seliga
G. Melendez (Proj. Mgr)

Sam Murray
 Signature

OFFICE COPY

J. Napolitano (w/2 sets)